MEMORY RETRIEVAL LATENCY AND QUANTITY AS A FUNCTION OF OBJECTIVE SELF-AWARENESS AND SELF-SCHEMATA

By

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TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS..... iii

LIST OF TABLES..... vi

LIST OF FIGURES..... vii

ABSTRACT.....viii

CHAPTERS

I INTRODUCTION..... 1

Introduction to the Investigation..... 1
Purpose of the Investigation..... 5
Need for the Investigation..... 5
Significance of the Investigation..... 8

II REVIEW OF THE LITERATURE..... 10

Memory Theory and Research..... 10
Self-Schemata Theory and Research..... 18
Self-Awareness Theory and Research..... 25

III METHODOLOGY..... 33

Introduction..... 33
Research Design..... 33
Independent Variables..... 34
Objective Self-Awareness..... 34
Schemata Congruence..... 35
Schemata Evaluation..... 36
Determination of Schemata..... 37
Dependent Variables..... 39
Retrieval Latency..... 39
Retrieval Quantity..... 40
Research Hypotheses..... 40
Data Collection..... 42
Subjects..... 42
Experimental Procedures..... 43

IV RESULTS..... 50

Preliminary Tests for Gender Effects..... 50
Effects on Retrieval Quantity..... 51
Main Effects..... 52
Two-way Interaction..... 53
Three-way Interaction..... 55
Effects on Retrieval Latency..... 57
Main Effects..... 58
Two-way Interactions..... 60
Three-way Interaction..... 63
Summary of Main Results..... 65

V DISCUSSION AND CONCLUSIONS..... 68

Memory Retrieval: The Role of Self-Schemata..... 68
Memory Retrieval: The Role of Self-Awareness..... 73
Implications of the Results..... 80
Limitations of the Investigation..... 82
Recommendations for Future Research..... 83

APPENDICES

A EXPERIMENTAL STIMULI..... 86

B INFORMED CONSENT..... 90

REFERENCES..... 91

BIOGRAPHICAL SKETCH..... 104

LIST OF TABLES

Table		Page
1	Gender X Schemata Evaluation Interaction on Mean Retrieval Quantity	50
2	ANOVA: Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity	51
3	Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity	52
4	Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Quantity	54
5	Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Quantity	56
6	ANOVA: Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency	58
7	Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency	59
8	Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Latency	61
9	Self-Awareness X Schemata Evaluation Interaction on Mean Retrieval Latency	62
10	Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Latency	64
11	Experimental Stimuli	87

LIST OF FIGURES

Figure		Page
1	Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity.....	53
2	Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Quantity.....	55
3	Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Quantity.....	57
4	Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency.....	60
5	Self-Awareness X Schemata Congruence Interaction on Main Retrieval Latency.....	62
6	Self-Awareness X Schemata Evaluation Interaction on Main Retrieval Latency.....	63
7	Self-Awareness X Schemata Congruence X Schemata Evaluation on Main Retrieval Latency.....	65

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The experimental investigation examines the interactive influence of three control processes on the quantity of and latency to memory retrieval. Control processes examined are (a) the individual's state of consciousness (low or high level of objective self-awareness) at retrieval time, (b) the self-validating or self-invalidating implications of the recollection, and (c) the good-self or bad-self implications of the recollection. Undergraduates (n = 113) participated in (a) an assessment of their self-theories and (b) a retrieval task that concerned life experiences (cued by self-schemata, which represent self-perceptions). A 2 x 2 x 2 between-subjects design was used. Each factor represents a respective control process. Hypotheses concerned main effects of all factors, two-way interactions involving the first two factors, and three-way interactions on both retrieval quantity and

retrieval latency. All hypotheses were generally confirmed. Gender was counterbalanced and, excepting one marginally significant two-way interaction, was not a source of variation on dependent values. The results support the feasibility and effectiveness of using self-schemata as retrieval cues and implicitly supported their role at the encoding stage. The preferential access of self-validating experiences occurs only in the high self-aware state, and conclusions concerning the preferential access of bad-self information also depend on a consideration of the level of self-awareness of the recollector. The results indicate that objective self-awareness, referring to that state of consciousness in which one is acutely aware of being an object in the world and the object of one's own consciousness, functions as a context that significantly influences persons' process of retrieving life experiences. The specific manner of its influence was found to depend on the other control processes. The results indicate that self-awareness governs the elevating and lowering of thresholds of memory retrieval, resulting in inhibition and facilitation effects, respectively. Self-awareness was concluded to inhibit self-deceptive tendencies and to facilitate veridical and extensive retrieval. One practical implication of that conclusion concerns the induction of that state during personality assessment in order to increase the predictive validity of the procedure.

CHAPTER I
INTRODUCTION

Introduction to the Investigation

Psychologists long have noted that human consciousness creates and projects upon itself a sense of having a distinctiveness, unity, and continuity in identity, a complex projection that is referred to as the "self" (James, 1890). The self tends to be identified by persons through the discrimination of its various aspects or characteristics, which are referred to as self-schemata by contemporary cognitive theorists (Markus, 1977). Markus and Smith (1981) clarified that self-schemata are "generalizations or theories about the self, developed from the repeated similar categorization and evaluation of behavior by oneself and others, that result in a clearly differentiated idea of the kind of person one is with respect to a particular domain of behavior" (p. 240). Persons are necessarily and continually selective in processing information pertaining to the self, and self-schemata provide a framework within which selectivity is systematic and meaningful rather than random (c.f., Neisser, 1967, 1976).

Self-schemata provide a framework within which a wide range of information is structured, transformed, and interpreted. Information encoded according to particular schemata appears to be decoded or retrieved most efficiently according to the same schemata. If the schemata used at the encoding stage are unavailable or altered at the time of decoding or retrieval, a loss or reconstruction of the encoded information may occur (Tulving & Thomson, 1973).

Much of the information that is processed by persons to develop and maintain their sense of self is information about past life experiences and behaviors. The amount and range of information is vast and indefinite given that persons recall life experiences dated to approximately age four (Crovitz & Quina-Holland, 1976). The information as it is organized, reconstructed, and recollected at any given moment in time is an integral constituent of the self. The act of recollecting the information of life experiences and behaviors may be considered to be a kind of selective exposure to the self. Persons, therefore, play an inherently active role in self-definition and self-maintenance.

Particular reconstructions and varying frequencies of recollection may be a means of elaborating upon a particular aspect of self, represented by a pole of a bipolar self-schema (e.g., kind-unkind, honest-dishonest). The organization of memories according to self-schemata is particularly apparent in persons' tendencies to recall readily many instances when they acted in a manner to support a particular self-conception. Kihlstrom and Nasby (1981) noted that the ease or speed of recollection is, in itself, of significance because it will directly affect the probability of that information being used in subsequent processing. This type of self-referent information appears to be used in evaluating oneself, in evaluating others, and in determining courses of action.

Persons do not recall past actions in an exhaustive manner. Rather, they implicitly and explicitly choose to recall certain experiences, and they implicitly and explicitly select solely one of many potential frames of reference in which to reconstruct any particular

experience. Selection invariably implies rejection and results in biased processing, a fact that most persons tend to deny (Erdelyi, 1974). Even the most introspective of persons who attempt to examine the nature of the selectivity of their memory processing are inherently limited in their observation of the path and process of retrieval. They, rather, can be aware solely of the products of their search process. The products appear to be largely provided through an unconscious process, referring to a process of which persons are unaware (Underwood, 1979).

The process of recollecting past behaviors and experiences, if governed by more general principles of laboratory memory recollection, should depend on the context in which the process occurs (Tulving, 1983). The context refers to all factors, both from within and without the individual, present at the time of retrieval. An incredibly diverse range of contexts has been investigated concerning laboratory memory. These include cognitive, physiological, motivational, and environmental (e.g., color of the laboratory walls) contexts. Scant experimental research has been directed to contexts that determine the recollection of life experiences, however.

One context that appears to be centrally meaningful in determining the retrieval of personal life experiences is the individual's awareness of his or her identity. This awareness is alternatively referred to as self-awareness, objective self-awareness, or private self-consciousness. Such self-awareness is considered to be the uniquely human capacity by which persons become aware of being an object in the world and an object of their own consciousness (Duval & Wicklund, 1972).

Differences between persons, and within persons over time, have been documented in the tendency to spontaneously and volitionally fluctuate in self-awareness, and these fluctuations have been found to have a pronounced and widespread impact on information processing (c.f., Carver & Scheier, 1981). The theoretical nature of the mechanisms accounting for the manifestations is controversial, however, and the impact of self-awareness as a context of real-life memory retrieval has yet to be examined.

Self-awareness can be viewed as a retrieval context that significantly determines the purposes and consequences of memory processing, noting that persons are assumed to be motivated by anticipated consequences. Memory reconstruction and recollection and, hence, self-elaboration, is conceptualized to be determined by selective, biased, and motivated processing in the interest and context of the self as an object of consciousness. The role of self-related motivational processes in memory theory is considered undeniable by a diverse range of theorists, including Rappaport (1971), a prominent psychoanalytic theorist, and Neisser (1967), a prominent cognitive theorist. In his classic, influential exposition of the cognitive approach, Neisser (1967) asserted that the role of motivation could not be even temporarily suspended in the development of memory theory. The purposes and consequences of particular recollections clearly appear to interrelate to varying degrees of self-enhancement, self-derogation, self-confrontation, self-elaboration, and self-continuity. The purposes and consequences of recollections for a sense of self should, therefore, depend on the specific nature and intensity of persons motivations with respect

to self-elaboration and self-maintenance at the immediate moment of memory retrieval. Self-awareness is, therefore, conceptualized to be a context that significantly influences the process and content of memory recollection.

Purpose of the Investigation

The present investigation attempts to examine the interactive influence of various control processes on persons' recalling of life experiences. These control processes include (a) the state of consciousness (i.e., specifically, level of self-awareness) at the time of retrieval, (b) the good-self or bad-self implications of the recollected experience, and (c) the self-validating or self-invalidating implications of the recollected experience. The structure and elaboration of the forementioned self-schemata interrelate to the latter two processes.

Need for the Investigation

A vast amount of research on memory functioning has been conducted since Ebbinghaus's (1885/1913) classic work over 100 years ago. During this time, sophisticated paradigms have been developed in which to study memory functioning. The research has resulted in sophisticated formulations for explaining the processes of encoding, retaining, and retrieving memories. These theories of memory functioning have, however, been based on research that has used other than memories of life experiences as targets of retrieval. The targets of retrieval instead have been laboratory stimuli including words, figures, pictures, prose, and, rarely, a more complex experience. As both Underwood (1979) and Neisser

(1982, 1985) have vigorously asserted, the experimental investigation of memories as continually accessed contents of consciousness or mental life has been conspicuously neglected at the expense of the investigation of memories of laboratory stimuli in the context of the rules of abstracted verbal learning. This has been due both to the dismissal of the self in experimental research and to the misperception that experimental rigor and control were difficult to achieve in research where memories of life experiences were the retrieval targets. Consequently, very little is known about the course of everyday memory for past life actions and experiences. Prominent laboratory memory researchers increasingly have noted this striking research gap and have asserted that it need not, and cannot justifiably, continue (Gruneberg, Morris, & Sykes, 1978; Loftus, 1982; Schacter & Tulving, 1982). The experimental investigation of the content and process of the recollection of experiences that have occurred outside of the experimental laboratory is widely regarded as long overdue within mainstream experimental memory research.

There is also an acknowledged need for research concerning memories of life experiences within realms of research outside mainstream memory. Memories are increasingly being recognized as pervasive constituents of the ongoing flow of mental life. In fact, researchers investigating the constituents of mental life have found that persons spend only one-third of the time focused on the present, and that much of the remaining two-thirds is focused on memories of life experiences (Pope, 1978). Memories of life experiences constitute a significant realm of human functioning that has been ignored as such and undoubtedly

interrelates in yet to be understood ways with cognitive, motivational, personality, and interpersonal functioning. Psychologists have begun to acknowledge the need for real-life memory research and have identified specific directions of research exploration (Bower, 1981; Erdelyi, 1974; Erdelyi & Goldberg, 1979; Kihlstrom, 1981; Kihlstrom & Nasby, 1981; Luborsky, Sackheim, & Christoph, 1979). Kihlstrom (1981), a prominent cognitively oriented personality psychologist, stipulated that memory needs to be conceptualized as a process rather than a static entity and recommended that the mechanisms of the process be investigated. Neisser (1976) clarified the need for a full-fledged theory on memory of life experiences that accounts for the role of both schemata and motivation. Kihlstrom and Nasby (1981) have proposed that recollections be assessed as part of routine clinical personality assessment and that a research base to help establish a data-gathering and interpretative method be developed. Erdelyi and Goldberg (1979) and Luborsky et al. (1979) have clarified the need for understanding the intrapersonal context of memory retrieval with particular attention to the motivated decision processes occurring on all levels of awareness that regulate the raising and lowering of thresholds of cognitions. Cognitive behavioral psychologists also have delineated the need for the systematic, controlled investigation of the many levels of awareness within which memories and other cognitions may operate and of the processes regulating their access and use (Bowers & Meichenbaum, 1984; Clark & Teasdale, 1982; Erdelyi & Goldberg, 1979; Hersen & Bellack, 1976; Kendall & Korgeski, 1979; Nisbett & Wilson, 1977; Teasdale & Taylor, 1981).

Thus, both within and without mainstream memory, there is a clear recognition that memory retrieval is a complex process that is likely to be affected by (a) the total context present at the time of retrieval and (b) the nature and use of schemata in the organization and reconstruction of information. Each of the above variables is already well-established in laboratory memory research as significantly determining the content, speed, and quantity of memory retrieval, though their significance in the retrieval of memories of life experiences has yet to be established. There is a need to examine the impact of these variables in a manner that allows both for the generalization of laboratory memory experimental phenomenon and for the validation of the highly private, idiosyncratic, and inherently self-involved nature of memories of life experiences. An examination of the impact of objective self-awareness (i.e., as a retrieval context) in interaction with self-schemata on the content and process of the recollection of life experiences, therefore, may extend and refine the literature.

Significance of the Investigation

The present investigation contributes to the building of a multi-level, multiprocess model of memory functioning that encompasses long-term memory functioning associated with life experiences. Variables to be included in the model are identified, and an explanation of the manner in which they interact to impact on the retrieval process is proposed. The ecological relevance of experimental memory research is extended through the examination of memories of life experiences rather than of memories of laboratory stimuli, and through the elaboration of

variables and theory related both to the workings of the self and to states of consciousness (c.f., Hunt, 1985). An additional contribution, and one that is particularly important given the preliminary state of memory (i.e., concerning life experiences) research, is the development of a research paradigm.

CHAPTER II
REVIEW OF THE LITERATURE

Memory Theory and Research

A vast amount of memory research has been conducted over the past 100 years (Ebbinghaus, 1885) in an attempt to build a comprehensive model of memory functioning that explains and predicts all types of memory processing, including longterm memory functioning associated with personal life experiences. A minimum of three levels of storage are generally accepted: (a) a sensory memory with brief trace duration (c.f., Sperling, 1960), (b) a short-term memory with limited capacity (c.f., Broadbent, 1958), and (c) a long-term memory of indefinite capacity (c.f., Frijda, 1975). Research attention predominantly has been directed to the sensory and short-term memory. Research that has been directed to long-term memory has investigated memory of laboratory stimuli rather than memory of life events since the latter was perceived to be difficult to examine within the experimental laboratory. Two major contributions of laboratory memory research to an investigation of memory of life experiences are (a) the development of experimental paradigms and (b) the identification of robust principles governing memory functioning.

The language used in memory theory is limited in its usefulness for memory theory in which the retrieval targets are life events. It is insufficiently powerful and comprehensive to allow for a description of a working synthesis of the multiple interactions between the reconstruction and recollection of life experiences and processes defined as identity, motivation, attention, cognition, perception, affect, and

neurology. The incredibly complex and idiosyncratic nature of memory for experiences that have transpired during an entire lifetime will require the introduction of theory and language from the personality and psychoanalytic realms, in particular.

The majority of long-term memory research (i.e., concerning life experiences) has been conducted within the personality and personality assessment realms. One dominant research issue has concerned whether persons recall more affectively pleasant or unpleasant memories (c.f., Baddeley, 1983; Matlin & Stang, 1978). In one type of research paradigm that has been used since the early 1900s, subjects are requested to construct lists of events from either their recent past, within a range from one day to several weeks (Thompson, 1982, 1985; Turner & Barlow, 1951), or from their entire lifespan (Henderson, 1911; Meltzer & Ludwig, 1970; Washburn, Giang, Ives, & Pollack, 1925; Washburn, Harding, Simons, & Tomlinson, 1925). Strongman and Beatson (1981) conducted one of the more recent studies of this kind. They directed 29 subjects, aged 14 to 68 years, to describe into a tape recorder any personal emotional experiences from their lives.

The forementioned research has contributed minimally to an understanding of memory. This is partially because the experimental task was of a public self-disclosure nature (i.e., the subjects were required to disclose their memories to the experimenter). Thus, although the researchers purported to assess what the subjects were able to, or tended to, recall of their life experiences, they in actuality assessed what the subjects tended to disclose publicly. This experimental procedure has resulted in a lack of theoretical clarity in the memory

literature because the distinction between private self-disclosure and public self-disclosure is theoretically important and empirically justified.

Luborsky et al. (1979) recognized the importance of the foremention ed distinction as a consequence of conducting research on fluctuations in memory functioning during psychotherapy. They attempted to determine the intrapersonal and interpersonal factors that contribute to patients' memory lapses that occur within psychotherapy sessions. Verbatim accounts of psychotherapy sessions were analyzed according to a theoretically sophisticated system. The variables that correlated with patients' verbalizations that a memory lapse was occurring (e.g., "I forgot what I was going to say," "I now can't remember what happened") were identified. The researchers initially assumed that a verbalization indicating a memory lapse reflected a true memory lapse but they later recognized that the former does not necessarily reflect the latter. The former may also, or instead, reflect a withholding of the thought or memory from the therapist and hence reflect a lack of public self-disclosure. Their methodology did not allow, however, for an analysis of the role of solely intrapersonal factors in memory dysfunction. The empirical analysis of the intrapsychic context of cognition, including memory, is a largely unexplored, though emergent, area of investigation (c.f., Bowers & Meichenbaum, 1984; Erdelyi & Goldberg, 1979; Kihlstrom, 1982; Kihlstrom & Nasby, 1981).

Memory retrieval traditionally has been examined as a rather static entity within personality assessment literature. This research has examined the relationship between characteristics of earliest

recollections and personality characteristics (Bruhn, 1981; Langs, 1965; Levy & Grigg, 1962; Mayman, 1968; Purcell, 1952). The most elaborate study, conducted by Langs (1965), involved the correlational analysis of 62 earliest recollection memory variables with 76 personality variables. This type of research has established that earliest recollections are of some diagnostic significance. Further research investigation of earliest recollections must expand considerably on both the research hypotheses and the research paradigm, however, to be justified as a significant contribution to the literature. Explicit attention must be directed to an examination of the processes underlying retrieval and to the dimensions along which memories are organized.

Traditionally, there has been a strong research interest in the role of the temporal dimension in the encoding and organization of memory. The notion may be intuitively appealing though research indicates that memories are not intrinsically dated or temporally ordered (c.f., Underwood, 1977). Research indicates that when persons attempt to temporally order or date life events they necessarily must consciously infer that information from idiosyncratic contextual information associated with the trace (Friedman & Wilkins, 1985; Loftus & Marburger, 1983; Tzeng & Cotton, 1980; Wagenaar, 1986). Thus, the role of schemata and retrieval context is supported. These variables are discussed in the next two sections of the literature review.

There is a rapidly developing realm of research concerning memories of life experiences that attempts to examine the process of retrieval and the systematic organization of memories and, thus, to validate contemporary cognitive principles. In one subset of this realm,

researchers have used a case-study methodology in which the researchers were the subject (Galton, 1879, 1911; Linton, 1975, 1978; Wagenaar, 1986; White, 1982). Wagenaar (1986) conducted the most extensive investigation of this kind. He recorded 2402 events (i.e., 1 or 2 events daily) from his everyday life during a six-year period. All events were recorded according to five aspects: (a) what the event was, (b) who was involved, (c) where the event happened, (d) when the event happened, and (e) an additional critical detail. Recall was cued by different combinations of the first four aspects and any given event was recalled only once during the study. Despite the drawbacks of the experimental design, the results were surprisingly consistent with existing research and demonstrate the potential utility of the case-study design in investigating relatively unexplored research territory such as autobiographical memory. For instance, Wagenaar found the "what" retrieval cue to be the most powerful single cue and "when" to be nearly useless. This substantiates the forementioned conclusion concerning the temporal dimension. Additionally, he found that errors made in the dating of salient events were in the direction of recency. This substantiates the well-known telescoping phenomenon, which refers to the recency dating error (c.f., Loftus & Marburger, 1983), as well as a phenomenon recently documented by Brown, Rips, and Shevell (1985). The latter found that the more that is known about an event, the more recent the event seems to have occurred.

Another subset of the contemporary cognitive realm of autobiographical memory research includes studies conducted by Chew and Kihlstrom (1980), Clark and Teasdale (1982) and Robinson (1976, 1980). Chew and

Kihlstrom (1980) found that personality characteristics were reflected in memories of life experiences. They, therefore, refined the methodology, though not the theory, of the earliest recollection personality assessment literature. Chew and Kihlstrom used a procedure for sampling autobiographical memory based on Galton's (1879, 1911) chronometric studies of word association and memory. Galton (1911) noticed that a steady stream of recollections of life experiences came to mind evoked, he believed, by the succession of objects he observed along the course of his walk. Galton (1911), using himself as a subject, selected 75 words as stimuli for evoking memory recollection.

Crovitz introduced a variant of Galton's (1911) method into real-life memory research (Crovitz, 1973; Crovitz & Quina-Holland, 1976; Crovitz & Shiffman, 1974). The stimulus words used as retrieval cues in Crovitz' paradigm are selected randomly and have included "meeting," "wood," "water," "machine," "shoe," "window," and "dream" (Teasdale, Taylor, & Fogarty, 1980). The stimulus words are presented sequentially to the subject. The subject is typically allotted between 30 to 120 seconds per stimulus word to attempt to recall a life experience prompted by the stimulus word. The retrieval task is, thus, a projective, free-associative task. The process and content of memory retrieval are the dependent variables.

Robinson (1976) refined the above described paradigm by systematically selecting retrieval cues from syntactic categories. He selected 16 words from each of an activity category (e.g., make, throw, practice), an object category (e.g., river, window, milk), and an affect category (e.g., surprised, lonely, doubt). In a subsequent investigation,

Robinson (1980) extended his investigation of affect words in order that he could examine the relationship among pleasantness, intensity, and speed of recall of personal experiences. Robinson (1980) requested that subjects report the first life experience recalled in response to a series of fifteen pleasant or unpleasant affect words.

Memories of life experiences also have been examined in a systematic manner with attention to the process of retrieval in an attempt to investigate the development and maintenance of depression (Clark & Teasdale, 1982; Ellis, Thomas, McFarland, & Lane, 1985; Lloyd & Lishman, 1975; Teasdale & Fogarty, 1979; Teasdale, Taylor, & Fogarty, 1980). The paradigm used was the above described projective, free-associative stimulus word paradigm adapted by Crovitz (1973). The independent variable typically was the mood state of the subject; the dependent variables typically were the latency to memory retrieval and the hedonic tone (e.g., happy versus unhappy) of the memories retrieved. Memories were, thus, conceptualized to be self-referent cognitions that functioned in the development and maintenance of depression.

The research studies that have been conducted using Crovitz's (1973) method of providing stimulus words to cue memories of life experiences constitute the most sophisticated longterm memory research to date (i.e., of that concerning memories of other than laboratory stimuli). They provide a background to the present investigation in some of the very general principles examined, rather than in the specific hypotheses. The research clearly demonstrates that the real-life memory retrieval process can be examined in a systematic manner within the experimental laboratory. Some systematic interrelationships between

characteristics of the retrieval cues, retrieval latency, characteristics of the subject (e.g., personality, gender, and affective state), and characteristics of the recollections have been observed. Theory development lags far behind the few systematic relationships that have been observed, as noted by Neisser (1985). Clearly, an understanding of the real-life memory retrieval process is rudimentary.

An understanding of the process seems to be most significantly advanced by an examination of control processes. This was Johnson's (1974) conclusion, in his review of the literature on the relationship between personality and memory. Johnson declared that control processes should receive primary concern in a model of personality and memory. Control processes refer to "subject determined processes in memory" including "both the strategies and techniques used by the subject, and his decision to use them" (Johnson, 1974, p. 4). Control refers to the strategies (c.f., Adams, 1985) and decisions by which subjects use their memories. Control processes include the decision whether or not to initiate a search, the time taken to make and implement the decision, the particular organizing and grouping schemata that are implicitly or explicitly used, the specification of particular criteria as to what constitutes an adequate retrieval, and the selection of one particular type of integration and interpretation of the recollected information. The role of implicit and explicit selection processes and a "top-down" reconstructive type of processing is, thus, validated. All control processes presumably occur at varying levels of awareness, notably including levels outside of conscious awareness. Additionally, differences across contexts and within individuals are expected to occur in

the use of control processes. This theoretical and experimental approach is taken in the present investigation. The roles of self-schemata and objective self-awareness as control processes are described in the following two sections of the literature review.

Self-Schemata Theory and Research

Memory theorists and researchers (Bartlett, 1932; Schachtel, 1947; Norman & Bobrow, 1975; Rappaport, 1971), personality theorists and researchers (Kelly, 1955; Mischel, 1981; Markus, 1977), and cognitive theorists and researchers (Neisser, 1967, 1976; Piaget & Inhelder, 1952) have long recognized the importance of understanding the process and structure of individuals' organization of their psychological world and have advanced the notion of knowledge structures, referred to generically as schemata, to describe the active organizational processing of information at all stages of input and output. Schemata are nonspecific representations of prior experiences that are elaborated on at every moment of ongoing mental activity and used to guide the comprehenders interpretations, inferences, expectations, and attention (Neisser, 1967). Schemata are both necessarily and continually used to impose order and meaning upon the data of life experiences (Neisser, 1967, 1976). Schemata are highly structured and highly integrated in their representation of the components, attributes, and relationships that typically occur in specific exemplars. Neisser (1967, 1976) clarified that schemata are used in an embedded rather than successive manner in that various schemata are simultaneously active and hierarchically embedded in more extensive schemata.

The use of schemata in memory processing and retrieval will be examined in this section of the literature review. Additionally, the use of self-schemata in the processing and retrieval of information pertaining to the self will be reviewed. Finally, the preliminary research that explicitly investigates the role of self-schemata in the processing and retrieval of memories of life experiences will be reviewed.

Bartlett (1932) initiated the experimental investigation of the role of schemata in memory functioning. He examined subjects recall of narrative prose passages and he observed lawful omissions, transformations, reorganizations, and other types of distortions. Bartlett concluded, "Remembering appears far more decisively an affair of construction than one of mere reproduction" (p. 205) and initiated, what is referred to as, the constructivist approach to memory functioning. The constructivist approach validates the use of schemata as organizing principles in the processing and retrieval of memories.

The use of schemata is particularly apparent in the category clustering phenomenon, which was identified by Bousfield (1953) using a free-recall paradigm. In any of the many variations of the paradigm, the experimenter presents information to the subjects and subsequently requests the subjects to reproduce the information from memory. No retrieval cues are provided. Bousfield found that when subjects are presented with a series of randomly ordered words that have been systematically selected from certain commonly identified categories, the subjects regroup the words at retrieval time by the conceptual categories rather than by the presentation order (c.f., Halpern, 1986). Subsequent

researchers found that the category clustering effect persists even when the stimulus information is not selected from commonly identified conceptual categories; the subjects then cluster according to their personal, idiosyncratic categories or schemata. These findings corroborate Schachtel's (1947) observation that schemata function as memory categories. The accessibility of schemata specifying conceptual relations among input information has been found to be a critical determinant of free-recall performance (Anderson & Bower, 1973; Tulving, 1962; Tulving & Thomson, 1973).

In a variant of the free-recall paradigm referred to as the incidental free-recall paradigm, a variant popularized by Craik (Craik & Lockhart, 1972; Craik & Tulving, 1975), the subjects are not informed that they are participating in a memory study until the retrieval stage. The quantity of recall as well as the specific, biased nature of the content of recall is assessed. Matlin and Stang (1978) conducted a multiple regression analysis of 99 of these selective word recall studies. They found that selectivity is more likely to be demonstrated if there is a delay, even if only of a few minutes, between word presentation and word retrieval. Subjects presumably consolidate the target information with self-schemata to an increasingly greater degree the more elapsed time between information presentation and information retrieval.

The use of schemata in a manner to retroactively affect recall of behavioral personality trait information was demonstrated by Higgins and King (1981). Undergraduate students were requested to read a paragraph that ostensibly was about another student. The paragraph contained

evaluatively positive, negative, and ambiguous descriptive information. Recall of the information was requested either 20 minutes or 1 week later and was cued by scales with either evaluatively positive or evaluatively negative labels. Reproduction distortions were significantly more positive when subjects responded on scales with positive labels and significantly more negative when subjects responded on scales with negative labels. Moreover, there was twice the reproductive memory distortion after a 1-week delay compared with a 20-minute delay; Matlin and Stang's (1978) above cited conclusion is thus substantiated. Undoubtedly, when persons recall self-descriptive incidents that have occurred during their lifetime, the reproductive distortion is tremendous.

The specific use of schemata is frequently investigated with the "release from proactive inhibition" (RPI) effect observed in the Brown-Peterson paradigm. In this paradigm, three words are presented for encoding but a mental arithmetic task is immediately presented to prevent rehearsal of the words. Brown (1958) and Peterson and Peterson (1959) independently reported the now robust finding that recall of the words is significantly impaired after approximately 18 seconds of mental arithmetic. Subsequent research has indicated, however, that recall is unimpaired on the first few trials and that impairment occurs only if all words constitute a single category (Keppel & Underwood, 1962). Proactive inhibition builds in a single category so that even a very short period of mental arithmetic produces significant memory impairment though it is released with category shifts. In the latter case, memory for information in the new category is comparable to memory for

information in the first trial of the initial category. If information from the new category is presented on subsequent trials, proactive inhibition again builds to be released only by another category shift. Subjects have been found to categorize stimulus words according to taxonomic categories (e.g., types of trees or food), sensory modality categories (e.g., visual or auditory information input modality), and, relevant to the present investigation, connotative categories including positive versus negative (Wickens, 1972), masculine versus feminine (Kail & Levine, 1976), and self-descriptive versus nonself-descriptive (Nasby, 1980). The RPI research demonstrated that persons continually and implicitly sort information into categories or schemata for memory encoding and retrieval.

Considerable research has demonstrated that the schemata that most efficiently facilitate the retrieval of stored information are the schemata that were used at the time of encoding the target information. This principle, identified by Tulving and Thomas (1973), is referred to as the encoding specificity principle. Tulving and Thomas stated, "[the] specific encoding operations performed on what is perceived determine what is stored, and what is stored determines what retrieval cues are effective in providing access to what is stored" (p. 369). Implicit in this well-validated principle is the notion that the retrieval of stored information never occurs spontaneously but is initiated always by some kind of cue, notwithstanding that the instigating cue cannot always be identified (Tulving, 1976). In the present investigation, schemata were provided by the experimenter to function as retrieval cues. Specifically, self-schemata, which represents self-perceptions, were provided

since they have been found to be centrally used in the encoding and decoding of information pertaining to the self (Markus, 1977; Mills, 1983; Kuiper & Rogers, 1979; Rogers, Kuiper, & Kirker, 1977).

Markus (1977) has provided preliminary support for the use of self-schemata in the encoding and decoding of self-information. Markus classified subjects as high independent, low independent, or aschematic (i.e., the dimension was not very important or self-relevant). In part of her investigation, she presented to subjects a list of eight independent (e.g., individualized, leader) or dependent (e.g., conformist, follower) adjectives. She requested subjects to identify self-descriptive adjectives and list reasons to support their choice. She requested the subjects to cite specific evidence from their past behaviors. Markus found that high independent subjects supplied, on the average, .93 examples per independent word, and more examples than did aschematic subjects. This quite preliminary research directly supports the use of self-schemata in the organization and retrieval of past behaviors.

Another part of Markus's (1977) investigation is relevant to the present investigation. Markus provided the three groups of subjects with bogus feedback about their degree of "suggestibility" (p. 73) ostensibly on the basis of psychological assessment data. Independent subjects were given dependent feedback (i.e., they were told they were "suggestible") and dependent subjects were given independent feedback (i.e., they were told they were "not suggestible"). Self-perceptions were reassessed following the feedback according to both the extremity of self-ratings on an adjective checklist and rating latencies. The rating latency refers to the time taken to rate a particular self-perception. The bogus feedback had no impact on the checklist self-ratings,

though it did impact on the rating latencies. Rating latency increased for dependent and independent, though not aschematic, subjects on self-ratings of independence and dependence, respectively. Thus, reaction time assessment data proved to be a sensitive, discriminating measure of a change in self-perceptions undetected by traditional adjective checklist ratings. In the present investigation, self-ratings were assessed using both checklist and rating latency measures.

Markus's (1977) study, among other studies in which self-schemata were examined, has been criticized for various reasons related to the inadequate assessment of schemata and the resultant lack of predictive validity. As examination of the criticisms clarified that an assessment of self-schemata in which rating extremity is not confounded with schemata importance, and in which unipolar self-ratings in addition to bipolar self-ratings are assessed, furthers the definitional, operational, and predictive precision of the self-schemata concept.

An understanding of the role of schemata in memory processing additionally entails an examination of the motivational retrieval context, since schemata are used in a manner that is motivated by the anticipated consequences of their use (c.f., Bartlett, 1932; Bruner, 1957; Neisser, 1967; Schachtel, 1947). Bartlett (1932) used the term attitude to refer to the totality of the motivational context in which schemata are used. He noted: "Here is the significance of the fact . . . that when a subject is being asked to remember, very often the first thing that emerges is something of the nature of his attitude. The recall is then a construction, made largely on the basis of the attitude" (p. 207). Bruner (1957) noted that instances of particular schemata are actively

sought when a person's needs or ongoing activities require the information. In pursuit of specific goals (e.g., to form an impression of self as being a helpful person), instances of the particular self-schema (e.g., assisting another person with his or her work, giving another person advice) are actively sought and "come to mind." As Bruner (1957) pointed out, this type of categorizing is often an implicit or unconscious process. These categorizing and subcategorizing processes are seen to be an intrinsic part of the multidimensional representation termed a memory. In the present investigation, objective self-awareness was viewed as a motivational context that significantly determines the nature and extent of the elaboration of self-schemata.

Self-Awareness Theory and Research

The capacity for objective self-awareness is considered to be a uniquely human characteristic. Persons become aware of being an object in the world and an object of their own consciousness, hence, "objectively" self-aware. Self-awareness, as the term is typically used, and as the term is used in the present discussion, refers to objective self-awareness. The terms are, thus, interchangeable. Self-awareness refers to not simply the tendency to focus on some aspect of the self, but to the overall awareness of, and reaction to, the duality of consciousness.

The phenomenon of self-awareness has long been recognized within philosophical and psychological realms, though only recently has it been recognized within experimental psychology. It was introduced as an experimental variable by Duval and Wicklund in 1972 and it since has been justified extensively both as a theoretical construct and as an

empirical variable. The rapidly increasing interest in self-awareness appears to be due primarily to its pronounced consequences for information processing. Self-awareness has been found to impact on information processing whether the information is externally or internally generated and whether the information pertains to the environment or to the self. The consequences of self-awareness are, thus, pervasive. Persons are active processors rather than passive recipients of information (Neisser, 1967) and self-awareness is a significant factor affecting the specific manner of processing. Although a multitude of factors undoubtedly affect the manner of processing, self-awareness is of particularly central significance given its ongoing, fluctuating impact. Persons fluctuate over time in their level of self-awareness, and they also differ from each other in their disposition to volitionally induce self-awareness.

Interindividual or dispositional differences in the tendency to volitionally induce self-awareness have been detected and assessed. Fenigstein, Scheier, and Buss (1975) developed a scale of self-consciousness that has one subscale to assess dispositional differences in private self-consciousness. The effects of high private self-consciousness have been found to parallel the effects of experimentally heightened objective self-awareness, thereby lending support and credibility to the overall self-attention construct. Carver and Scheier, in their summary and integration of the objective self-awareness literature (1981), concluded "Very few, if any, constructs in social psychology have been more thoroughly validated than the self-attention construct" (p. 50).

Many events and variables influence persons' level of self-awareness. Two common events in everyday life that lead to increased self-awareness, as well as to increased public self-consciousness, are (a) the experience of eye contact and (b) the presence of an audience or observer. The presence of physiological arousal may also affect self-awareness, though researchers disagree on the presence and direction of impact. Wegner and Giuliano (1980) found that it increased self-awareness; McDonald, Harris, and Maher (1983) found no such increase and interpreted the former result as an experimental artifact; Diener (1980) theorized that physiological arousal may reduce self-awareness and increase deindividuation. Deindividuation presumably lessens private, internally governed self-regulatory processes (Diener, 1979, 1980). Deindividuation experimental manipulations include dimmed lights, the absence of name tags, the absence of addressing a subject by his or her name, and the wearing of coveralls by subjects to diminish the sense of identity personal clothes provide. The deindividuation manipulations were developed in order to diminish subjects' awareness of self as an individual in the public context of other persons, though subsequent research has indicated that private self-awareness as well as public self-awareness is diminished. Alcohol intake also has been found to diminish self-awareness (Hull, 1981; Hull, Levenson, Young, & Sher, 1983; Hull & Young, 1983); alcohol consumption was found to inhibit the encoding of self-relevant information in dispositionally high private self-conscious male social drinkers to the extent that their responses were similar to the responses of dispositionally low private self-conscious drinkers. Finally, hypnotic states have been hypothesized to

affect self-awareness, though no global statement can be made concerning the direction of impact since hypnotic states are not considered to be unitary or consistent states (Sheehan, 1979; Tart, 1975).

Wicklund and Duval (1971; Duval & Wicklund, 1972) were the first researchers to intentionally and systematically vary subjects' level of self-awareness. They chose several manipulations, including a mirror and a camera, that intuitively served as reminders of the self. Many of their manipulations were found to enhance states, notably public self-consciousness, in addition to self-focus, however. Public self-consciousness refers to the state in which persons become aware of themselves as an object to others, thus, of their publicly displayed self-aspects. The task of researchers following the lead of Wicklund and Duval, therefore, was to validate a self-awareness manipulation that solely heightened subjects' level of private objective self-awareness. A mirror has been identified as the optimal experimental manipulation. A considerable body of research evidence, reviewed by Carver and Scheier (1981), has supported its construct and discriminant validity. Differences between persons in modes of information processing become more pronounced. Significant, often extreme, effects in cognitive, affective, and behavioral domains have been demonstrated.

Gibbons (1978), for example, found that objectively heightened self-awareness during exposure to erotica appeared to cause persons to report reactions to sexual material that were more congruent with personal standards. Female subjects were selected on the basis of high or low scores on Mosher's (1968) sex guilt scale and the dependent measure was subjects' ratings of how sexually arousing, enjoyable, and well-written passages from a pornographic novel were. Correlations between

subjects' pretest sex guilt scores and their ratings of the passages were strong (r=.-57) in the high self-awareness (i.e., mirror presence) condition and much weaker (r=.-01) in the low self-awareness (i.e., mirror absence) condition. High guilt women reported considerably less enjoyment and arousal under conditions of high self-awareness. Objective self-awareness, thus, impacted upon self-ratings of even self-perceptions, ratings that might seem beyond the boundary conditions of heightened self-awareness. The self-awareness literature has buttressed theory concerning the dominant, though fluctuating, impact of the self-system on the processing of information pertaining even to the self.

Another study, which was conducted by Carver (1975), is exemplary of the many studies that have demonstrated the impact of heightened self-awareness on behavioral self-regulation (Beaman, Klentz, Diener, & Svanum, 1979; Carver, Blaney, & Scheier, 1979). Subjects were selected on the basis of their high punitive or low punitive attitudes toward the use of physical punishment as a teaching technique and on the basis of their prediction concerning whether they would use punishment in this manner. Several weeks later, in an ostensibly unrelated experiment, the two groups of subjects were recruited to participate in an investigation of the effect of physical punishment on learning. The severity of shock level chosen by subjects to punish the confederate subject when the latter emitted incorrect responses was the dependent measure. In the low self-awareness (i.e., mirror absence) condition, no differences between the two groups were manifested. In the high self-awareness (i.e., mirror presence) condition, however, clear differences between the two groups were apparent: High punitive subjects chose even more intense

shocks and low punitive subjects chose even less intense shocks. Subjects presumably used their attitudes and self-concepts in choosing shock levels. This study is exemplary of research that has demonstrated that the impact of self-awareness is not global, but differentiated as a function of the self-standards of the subject.

Although the impact of objective self-awareness on information processing has been demonstrated in a variety of realms, the boundary conditions (i.e., the depth and breadth) of its impact require further delineation. The generalization from one realm of self-processing to another is not necessarily direct. Specifically, the impact of self-awareness on the process of reconstructing and recollecting life experiences has yet to be investigated. Carver and Scheier (1981) noted that a study conducted by Pryor, Gibbons, Wicklund, Fazio, and Hood (1977) is the most direct research support of the relationship between self-awareness and memory recollection. In that investigation, the impact of objective self-awareness on the truthfulness of undergraduate students' report of two objectively verifiable public facts was examined. The public facts were (a) their high school combined SAT scores and (b) their percentile ranking on their first psychology exam. The truthfulness of self-report of the SAT score was higher under the high self-awareness (i.e., mirror presence) condition, at least for low scoring subjects since high scoring subjects were truthful in either the high self-awareness condition or low self-awareness condition. Comparable differences were not found concerning the exam percentile data, but because exam scores were never given to subjects in percentile terms they were unlikely to have been encoded in that manner.

A close examination of the theoretical and empirical self-awareness literature revealed that self-awareness is a significant phenomenon; its impact is pronounced in a diverse range of processing realms. Considerable theoretical controversy was apparent concerning the manifestations of its impact and concerning the nature of the mechanisms that account for its impact. The various theories of self-awareness tend to differ from each other in the relative attention directed to motivational processes and to the relative acknowledgment of the various levels of conscious awareness at which information processing occurs (c.f., Carver & Scheier, 1981; Duval & Wicklund, 1972; Holzman & Rousey, 1966; Hull, 1981; Hull & Levy, 1979; Sackheim & Gur, 1978). There is some consensus, however, that self-awareness results in a heightened sensitivity to self-standards (Carver & Scheier, 1981; Lewicki, 1983), and in a concomitant striving to reduce the discrepancies through various strategies. In the present investigation, awareness of self as an object in the world and as an object of ones' own consciousness is considered to function in a screening, regulating, monitoring manner in the processing of information, specifically, memories of life experiences. Persons are presumably guided by implicitly private concerns in processing self-information. This type of self-regulation is distinctly different from a public, interpersonal type of self-regulation where self-presentation to other rather than to self is the control process; this important distinction is supported by theory and research (Fenigstein et al., 1975).

In the present investigation, self-awareness is hypothesized to be a retrieval context that selectively influences persons' process of retrieving memories of life experiences. When persons are highly self-aware, they are expected to be more motivated to orient toward, select,

and elaborate on particular types of memories and also more motivated to avoid, ignore, and not elaborate on other types of memories. Self-awareness is, thus, hypothesized to have both facilitation and inhibition effects presumably attributable to an intensification of self-regulatory efforts. The specific influence of self-awareness is hypothesized to depend on the self-validating or self-invalidating implications of the recollection. Certain memories reflect an aspect of self that one identifies with while others reflect an aspect of self that one disowns. In the experimental paradigm, the schemata congruence variable represents the self-validating or self-invalidating implications, respectively. The specific influence of self-awareness is hypothesized to depend also on the evaluative (positive, negative) implications of the recollection for the self-theory. Certain memories reflect a favorable attribute while others reflect an unfavorable attribute. Thus, self-awareness (low, high), schemata congruence (congruent, incongruent), and schemata evaluation (positive, negative) are examined insofar as they simultaneouly interact to influence two aspects of the memory retrieval process: (a) retrieval quantity and (b) retrieval latency. Self-schemata, which reflect self-perceptions that are hierarchically organized within an overall self-theory, function as the retrieval cues in the directed memory retrieval task.

CHAPTER III
METHODOLOGY

Introduction

The operational research question in the present experimental investigation was as follows: How, if at all, does the level of objective self-awareness interact with the nature of the memory recollection task to influence the memory recollection process? The independent variables schemata congruence and schemata evaluation were used to manipulate the nature of the memory recollection task. Schemata congruence refers to the self-congruence or self-incongruence of the schemata used as retrieval cues. Schemata evaluation refers to the positive or negative evaluative nature of the schemata used as retrieval cues. A memory, thus, could be either positive or negative and either self-congruent or self-incongruent. The impact of the variables was assessed on two dependent variables: (a) retrieval latency and (b) retrieval quantity. The experimental paradigm, thus, entailed three independent variables and two primary dependent variables. A description of these variables follows.

Research Design

A 2 x 2 x 2 factorial design was employed. The three between-subjects factors were self-awareness, schemata congruence, and schemata evaluation. Self-awareness had two levels (low, high); schemata congruence had two levels (congruent, incongruent); schemata evaluation had two levels (positive, negative). Thus, the eight experimental conditions are identified as (a) low self-awareness, congruent schemata,

positive schemata; (b) low self-awareness, congruent schemata, negative schemata; (c) low self-awareness, incongruent schemata, positive schemata; (d) low self-awareness, incongruent schemata, negative schemata; (e) high self-awareness, congruent schemata, positive schemata; (f) high self-awareness, congruent schemata, negative schemata; (g) high self-awareness, incongruent schemata, positive schemata; and (h) high self-awareness, incongruent schemata, negative schemata. Gender was counterbalanced in the experimental design. The two dependent measures were retrieval latency and retrieval quantity. A three-way analysis of variance (ANOVA) constituted the primary data analyses.

Independent Variables

Objective Self-Awareness

Persons differ across time and situation, and from each other, in their awareness of self as an object in the world as an object of their own consciousness. These differences in objective self-awareness have been found to have a pronounced impact on emotions, cognitions, and behaviors. In the present investigation, differences in objective self-awareness were effected using the traditional mirror paradigm. In this paradigm, an ordinary mirror is placed directly in front of the subject in the high self-awareness condition. No mirror is present in the low self-awareness condition. The experimenter does not mention the presence of the mirror and subjects reportedly do not express suspicion concerning its presence (Carver & Scheier, 1981). In the present investigation, objective self-awareness was a between-subjects factor.

The mirror is physically placed in a manner that it cannot be perceived as a two-way mirror. In the present investigation, the mirror was, therefore, obviously leaned against the wall. A two-way mirror implies observation by others and heightened awareness of the public aspect of the self and is, therefore, not solely a private self-awareness research manipulation. Considerable research evidence (c.f., Carver & Scheier, 1981) supports the distinction between public self-awareness and private self-awareness as both theoretically meaningful and empirically valid. This research evidence strengthens both the discriminant validity of the mirror as a private self-awareness manipulation and the construct validity of the private self-attention construct. This research evidence is, however, only part of the large body of research evidence in support of the mirror manipulation as a private self-awareness manipulation and of the overall private self-attention construct. The section "Self-Awareness Theory and Research" provided a review of objective self-awareness both as a theoretical construct and as an empirical variable.

Schemata Congruence

Certain recollections pertaining to the self are congruent with self-perceptions. Presumably, retrieving this information should validate a self-theory. Certain recollections pertaining to the self are incongruent with self-perceptions. Presumably, retrieving this information should invalidate a self-theory. The congruent or incongruent nature of the memory recollection task was manipulated by the independent variable, schemata congruence. Schemata congruence was a between-subjects factor with two levels: (a) congruent and (b) incongruent.

Each subject was presented with four schemata that were all either congruent or incongruent with subjects' self-perceptions on particular bipolar dimensions within their self-theory. For example, if a subject rated "shy" as self-descriptive, then "shy" was categorized as schema-congruent. If a subject rated "shy" as not self-descriptive, however, it was categorized as schema-incongruent. The determination of stimuli for the schemata congruence variable was individualized and derived from subject's self-ratings. Appendix A contains the experimental pool of schemata, and the section "Determination of Schemata" describes the schemata derivation process.

Schemata Evaluation

Certain recollections pertaining to the self reflect an aspect of self that is evaluatively positive. Certain recollections pertaining to the self reflect an aspect of self that is evaluatively negative. Schemata evaluation was a between-subjects factor with two levels: (a) positive and (b) negative.

Each subject was presented with four schemata that were all of either a positive or a negative evaluative nature. For example, "truthful" is of a positive aspect evaluative nature and "untruthful" is of a negative evaluative nature. The determination of the evaluative nature of the trait was taken from Anderson's (1968) normative data (see Appendix A). Anderson's (1968) likableness ratings were used. The higher rated trait of the bipolar trait pair was selected to function as the positive schema.

Determination of Schemata

The entire assessment of a subject's self-theory was conducted on a Commodore 64 computer. The subject completed various rating tasks, which are described later in this chapter (i.e., schemata ordination ratings, schemata self-description ratings). The computer was programmed to (a) hierarchically organize all traits according to their importance in a subject's self-theory, (b) sort the subject's self-ratings into either a congruent or an incongruent category, and (c) sort the traits into either a positive or a negative category. The computer was programmed to then select, from those traits ranked superordinate in importance, four schemata that were (a) either congruent or incongruent with a subject's self-perceptions and (b) of either a positive or a negative evaluative nature. The assigned experimental condition determined which selections were made, noting that the computer was programmed to randomly assign the experimental condition and proceed in the determination of schemata accordingly.

Random selection processes occurred concerning the selection of the four most superordinate schemata in those instances in which a subject rated more than four traits at a given ceiling rating (i.e., in the schemata ordination ratings). Similarly, if only three traits were at a given ceiling rating then the fourth trait was randomly selected from among those at the next highest rating. Note that subject A's ceiling rating may be a "6" and subject B's ceiling rating may be a "5." There is, thus, not necessarily consistency across subjects concerning the absolute ceiling rating though there is consistency across subjects concerning the relative position of the ceiling rating. Within any

particular subject, the schemata presented as retrieval cues were always those traits in the particular category that the subject perceived to be most important relative to all other traits. Across-subject consistency concerning the absolute ceiling rating was not built into the computer program because a subject selection bias would have invariably occurred (e.g., all subjects with less than 4 traits rated a "6," for instance, would be barred from participation).

The determination of schemata congruence was made on the basis of subjects' ratings on the self-description ratings task. The computer was programmed to classify a trait as schema-congruent if a subject rated the trait as self-descriptive (i.e., a rating of "3," "4," or "5") and as schema-incongruent if a subject rated the trait as not self-descriptive (i.e., a rating of "1," "2," or "3"). The computer was programmed such that the degree of schemata ordination prevailed over the degree of schemata congruence or incongruence; the latter was not controlled for because of the inevitable subject selection bias that would have resulted. Consequently, a moderately congruent schema (e.g., rating of "5" on the trait trustworthy) on a superordinate dimension (e.g., the trustworthy-untrustworthy dimension was the most important dimension) was selected over a very congruent schema (e.g., rating of "6" on the trait outgoing) on a less important or unimportant dimension (e.g., the outgoing-shy dimension is among the least important dimensions). The determination of schemata evaluation was based on normative data (see Appendix A) and, thus, was independent of a particular subject's ratings. The evaluative valence was built into the trait in the programming and that information was used simultaneously in conjunction with information pertaining to ordination and congruence in the derivation of schemata.

Dependent Variables

Retrieval Latency

Retrieval latency refers to the time elapsed between the presentation of the retrieval cue and the subject pressing a key on the computer indicating that a memory had been retrieved. The latency associated with each retrieval was recorded by the computer. The mean retrieval latency constituted the dependent variable. Retrieval latency was assessed in half-seconds since this level of discrimination has proven sufficient in memory research. It has been demonstrated that subjects take approximately 6 to 15 seconds to retrieve a memory of a life experience (Clark & Teasdale, 1982; Robinson, 1980). This is an extremely large range in the context of laboratory memory and information processing literature where milliseconds is the normative level of discrimination.

Retrieval latency has a well-established tradition and validity as a measure of the accessibility of memories in experimental memory research. Within nonmemory research, but self-schemata research more generally, reaction-time measures are also quickly becoming widely recognized as sensitive, discriminating dependent variables that detect intrasubject and intersubject differences undetected by more traditional measures (Markus, 1977; Turner, 1978b; Mills, 1983).

Retrieval Quantity

Retrieval quantity refers to the total number of memories retrieved. The subject was directed to press a key on the computer each time a memory within the specified category was retrieved; the quantity retrieved was recorded by the computer. Retrieval quantity has a well-established tradition and validity as a dependent variable in experimental memory research.

Research Hypotheses

1. A main effect of level of schemata evaluation on retrieval quantity. Subjects in a positive schemata condition demonstrate an increased retrieval quantity compared with subjects in a negative schemata condition.

2. A main effect of level of schemata evaluation on retrieval latency. Subjects in a positive schemata condition demonstrate a decreased retrieval latency compared with subjects in a negative schemata condition.

3. A main effect of level of schemata congruence on retrieval quantity. Subjects in a congruent schemata condition demonstrate an increased retrieval quantity compared with subjects in an incongruent schemata condition.

4. A main effect of level of schemata congruence on retrieval latency. Subjects in a congruent schemata condition demonstrate a decreased retrieval latency compared with subjects in an incongruent schemata condition.

5. A main effect of level of self-awareness on retrieval quantity. Subjects in a high self-awareness condition demonstrate an increased retrieval quantity compared with subjects in a low self-awareness condition.

6. A main effect of level of self-awareness on retrieval latency. Subjects in a high self-awareness condition demonstrate a decreased retrieval latency compared with subjects in a low self-awareness condition.

7. A two-way interaction between level of self-awareness and level of schemata congruence on retrieval quantity. Subjects in a congruent schemata condition demonstrate an increased retrieval quantity if they also are in a high self-awareness condition compared with a low self-awareness condition. Subjects in an incongruent schemata condition demonstrate a decreased retrieval quantity if they also are in a high self-awareness condition compared with a low self-awareness condition.

8. A two-way interaction between level of self-awareness and level of schemata congruence on retrieval latency. Subjects in a congruent schemata condition demonstrate a decreased retrieval latency if they also are in a high self-awareness condition compared with a low self-awareness condition. Subjects in an incongruent schemata condition demonstrate an increased retrieval latency if they also are in a high self-awareness condition compared with a low self-awareness condition.

9. A three-way interaction between level of self-awareness, level of schemata congruence, and level of schemata evaluation on retrieval quantity. Subjects in a schemata condition that is both congruent and positive demonstrate a particularly increased retrieval

quantity if they also are in a high self-awareness condition compared with a low self-awareness condition. Subjects in a schemata condition that is both incongruent and negative demonstrate a particularly decreased retrieval quantity if they also are in a high self-awareness condition compared with a low self-awareness condition.

10. A three-way interaction between level of self-awareness, level of schemata congruence, and level of schemata evaluation on retrieval latency. Subjects in a schemata condition that is both congruent and positive demonstrate a particularly decreased retrieval latency if they also are in a high self-awareness condition compared with a low self-awareness condition. Subjects in a schemata condition that is both incongruent and negative demonstrate a particularly increased retrieval latency if they also are in a high self-awareness condition compared with a low self-awareness condition.

Data Collection

Subjects

Description

One hundred and thirteen (n = 56 male, n = 57 female) subjects participated in the experiment. The modal age of the subjects was 18 years (n = 38); the mean age was 20.64 years. Eighty-two percent of the subjects were white, 6% were black, and 5% were of Hispanic ethnic background. Forty-eight percent of the subjects were first-year students, 20% were second-year students, 18% were third-year students, 10% were fourth-year students, and 2% were post baccalaureate students. Twenty-one percent of the subjects were undecided concerning their

college major, 13% were business majors, 13% were journalism majors, 11% were psychology majors, and 9% were health and physical education majors. Groups of subjects each comprising less than 5% of the total sample represented a wide range of other college majors.

Sampling procedures

The subjects were recruited from introductory psychology classes. Credit in partial fulfillment of the psychology course requirement was provided to participants; monetary compensation was not provided. Potential subjects were informed that the investigation concerned the organization of memories of life experiences. They were also informed that they would not be required to disclose the content of any recollection.

Experimental Procedures

Overview

The subjects were randomly assigned to the experimental conditions. Separate randomization schedules were used for male and female subjects because gender was counterbalanced in the design. All subjects were assured of anonymity by the use of a numerical identification system. All subjects were run individually. The subjects took approximately 40 minutes to complete the experiment. Participation involved completing three primary tasks: (a) schemata ordination ratings, (b) schemata self-description ratings, and (c) memory retrieval. The tasks are described below. All tasks were completed on a Commodore 64 computer; an 11 inch screen was used. The experimenter was not present in

the experimental room (and the door to the room remained closed) during task completion to assure the subjects of privacy. At the completion of all tasks, the experimenter addressed inquires concerning the investigation and requested that the subject not discuss the experiment with potential subjects.

Schemata ordination ratings

After reading and signing the informed consent form (see Appendix B), the subjects were seated in front of the computer and given practice to an equal response latency (i.e., within 500 milliseconds) in pressing one of six keys numbered from 1-6. The stimulus was the 6-point rating scale used in all subsequent rating tasks. The rating scale was in the same screen position for all rating tasks. As a first primary task, the subjects rated the importance of 28 bipolar trait pairs. The directions to this schemata ordination rating task were presented on the screen as follows:

> Persons form impressions of others according to various dimensions such as ambitious-lazy or polite-impolite. Persons differ concerning how important they believe any particular dimension is in forming an impression of another. One dimension at a time will be presented on the screen. Please rate each dimension according to how important you believe it is in forming an impression of a person. The rating scale is:
>
> not at all . . . . . very
> important 1 2 3 4 5 6 important.
>
> Rate according to your own private opinion.
> You will press a key from 1-6.

Twenty-eight pairs of traits were presented, one pair at a time. The presentation order was randomized across subjects. Unbeknownst to the subjects, the initial three pairs functioned solely to orient them

to the task. The three practice pairs (i.e., ambitious-lazy, forgiving-unforgiving, and conformist-nonconformist) were taken from the same stimulus pool as the subsequent twenty-five pairs (see Appendix A). Each pair remained on the screen until the subject pressed a rating key; the next pair then was presented on the screen. The computer recorded the pair of traits, the associated rating, and the associated rating latency (in milliseconds). The task functioned to assess subjects' ordination of schemata on an individualized basis in order that traits ranked as most important could be selected to function as schemata in the subsequent memory retrieval task. At the completion of the ratings, a screen message said, "Please get the experimenter now," so that the experimenter could verify that the directions to the self-description ratings task were understood.

Schemata self-description ratings

As a second task, the subjects rated themselves along a set of 53 traits. The directions to this schemata self-description rating task were presented on the screen as follows:

> Now, please rate each of the following traits according to the degree that you privately believe that the trait describes you. The rating scale is:
>
> not me . . . . . me
> ------ 1 2 3 4 5 6 --
>
> You will press a key from 1-6.

The fifty-three traits were presented, one trait at a time. The presentation order was randomized across subjects. Unbeknownst to the subjects, the initial three traits functioned solely to orient them to the task. The three practice traits (i.e., logical, unforgiving, and

impolite) were taken from the same stimulus pool as the subsequent 50 traits (see Appendix A). Each trait remained on the screen until the subject pressed a rating key, which advanced the next trait onto the screen. The computer recorded the trait, the evaluative valence, the associated rating, and the associated rating latency (in milliseconds).

Thus, an individualized data base was created for each subject from which the schemata congruence could be determined. At the completion of the ratings, a screen message said, "Do not press any key at this time. Please get the experimenter. Thank-you," so that the experimenter could verify that the directions to the memory retrieval task were understood.

Memory retrieval

As a third task, the subjects recalled memories of life experiences. The directions to the memory retrieval task were next presented as follows:

> A trait will be presented on the screen. Your task is to attempt to recall specific incidents in your life when you exemplified or demonstrated the particular trait. Press the red key each time you recall an incident. Please note the following guidelines:
>
> (a) You yourself must have exemplified the trait.
>
> (b) The incident may have occurred quite recently or many years ago.
>
> (c) You must be able to recall something that makes the incident a distinct memory. If the same type of incident happened more than once, press the key for each incident only if you can recall something that makes you certain that the other incident happened on a different occasion.

(d) It doesn't matter if another would agree with you as to whether the incident "counts" -- your opinion is all that matters.

(e) Press the red key as soon as you recall an incident, but not before.

(f) It is important that you keep trying to recall incidents during the allotted time. A total of 4 traits will be presented. The computer is programmed to give you 2 1/2 minutes per trait and a 30-second rest period between traits. You will know when time is up for a particular trait because "STOP" messages will appear all over the screen.

The written copy of the directions remained with the subjects so that they might reread them before they pushed a key to initate the retrieval task. The subjects were requested to wait until the experimenter left the room and closed the door before they initiated the retrieval task. The experimenter did not cite any examples of task completion in order to prevent priming effects. Additionally, the experimenter did not establish a standard for the subjects to recall "as many incidents as possible."

The subjects were also given a secondary task. They were requested to jot down no more than a word or so about each incident (subsequent to pressing the red key). They were provided with 4 blank sheets of unlined paper (one for each trait) and several pencils. The subjects were informed: "(a) the task is secondary in importance to the memory retrieval task, (b) don't write down the trait that was presented -- the computer will select the trait and the experimenter need not know which trait was selected, (c) jot down only enough so that you yourself can identify the incident for the purpose of answering an objective, standardized question about the incident after the retrieval task is over,

and (d) no one will ever see your notes -- you'll discard them." The question that the subjects were to answer concerned the date of the recollected incident. The subjects were not informed of this, however, to prevent any retrieval bias.

The computer was programmed to administer the entire memory retrieval task. One schema was presented every 3 minutes. A total of four schemata were presented. Each schema remained on the screen for 2.5 minutes at which time "STOP" messages appeared on the screen and the screen changed background colors. Any key presses that may have been made during the .5 minute intertrial interval were not counted. The computer was programmed to record the retrieval quantity and the retrieval latency.

The retrieval task is a variant of the traditional category generation task. In that kind of task, the subject is provided with a category such as "animals," and is requested to produce as many items from that category as possible within a standard period of time (Bousfield & Sedgewick, 1944). The task is most frequently used to examine the organization of semantic memory. Semantic memory, as distinguished from episodic memory by Tulving (1972), refers to memory for stored information of an impersonal, general nature such as the capital of France, the dictionary definition of a word, or the colors of the rainbow. Episodic memory receives and stores information about temporally dated episodes or events, and temporal-spatial relations among these events. It is always stored in terms of its autobiographical reference to the already existing contents of the episodic memory store (p. 385). The emphasis of episodic memory, the memory of interest

in the present investigation, is on the subjective flavor of the experience and the meaning and personal significance of the information for the target individual.

Subsequent to the completion of the entire memory retrieval task, the subjects were requested to date each recollected event as to month and year of occurrence. This is normative data in real-life memory research. The event-age then may be calculated by the experimenter. Event-age refers to the number of months from the present time of memory retrieval to the time at which the recalled event occurred (Robinson, 1976). Robinson (1976) analyzed the test-retest reliability of event age dating. He based his analysis solely on information pertaining to month and year of occurrence. He assessed the consistency of event-age dating on an individual basis by correlating the event-age reported in session one with the event-age reported in session two, which occurred one week later. The product-moment correlations obtained were uniformly high, averaging +.94. The modal error in redating was 12 months, indicating that subjects were more readily confused about specific year of occurrence than they were regarding relative time within a calendar year. Additionally, discrepancies were as likely to antedate as to postdate the event-age reported in session one. This principle was validated for events reported as occurring within a few weeks of the experimental sessions as well as for remote incidents (Robinson, 1976).

CHAPTER IV
RESULTS

Preliminary Tests for Gender Effects

Four-way ANOVAs were conducted (i.e., gender as the fourth independent variable in 2 X 2 X 2 X 2 designs) to discern any effects of gender on variation in mean retrieval quantity or latency values. The results indicated no significant main effects of gender and no significant two-, three-, or four-way interactions involving gender, excepting one marginally significant ($F = 3.58$; $p < .062$) Gender X Schemata Evaluation interaction on retrieval quantity values. Table 1 provides the concomitant mean retrieval quantity and standard deviation values. Note that all reported statistical analyses were conducted using the second edition of the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

Table 1

Gender X Schemata Evaluation Interaction on Mean Retrieval Quantity

Experimental condition	Mean retrieval quantity[a]	Standard deviation
Positive		
Female[b]	30.10	16.45
Male[c]	24.79	13.52
Negative		
Female[d]	16.81	8.88
Male[c]	18.93	10.43

[a] no. of memories.
[b] $n = 29$.
[c] $n = 28$.
[d] $n = 27$.

Effects on Retrieval Quantity

Table 2 summarizes the results of the 2 X 2 X 2 between-subjects ANOVA. The first factor reflected the levels of self-awareness (low, high), the second factor reflected the levels of schemata congruence (congruent, incongruent), and the third factor reflected the levels of schemata evaluation (positive, negative). Mean retrieval quantity was the dependent variable.

Table 2

ANOVA: Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity

Source of variation	Sum of squares	Df	Mean square	F	p
Main effects	6467.08	3	2155.69	19.89	.000
Self-awareness (SA)	1381.50	1	1381.50	12.75	.001
Schemata congruence (SC)	2476.15	1	2476.15	22.85	.000
Schemata evaluation (SE)	2629.57	1	2629.57	24.27	.000
Two-way interactions	1642.57	3	547.52	5.05	.003
SA X SC	1532.16	1	1532.16	14.14	.000
SA X SE	24.82	1	24.82	.23	.633
SC X SE	89.14	1	89.14	.82	.367
Three-way interaction	1125.32	1	1125.32	10.38	.002
SA X SC X SE	1125.32	1	1125.32	10.38	.002
Explained	9234.97	7	1319.28	12.17	.000
Residual	11378.80	105	108.37		
Total	20613.76	112	184.05		

Main Effects

Main effects on retrieval quantity occurred for all three factors. The effects indicated a greater retrieval quantity (a) in the high compared with the low level of self-awareness, (b) in the congruent compared with the incongruent level of schemata congruence, and (c) in the positive compared with the negative level of schemata evaluation. Table 3 presents the mean retrieval quantity values and concomitant standard deviation values for each of the two levels of each of the three factors. Figure 1 depicts the main effects.

Table 3

Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity

Experimental condition	Mean retrieval quantity[a]	Standard deviation
Self-awareness		
Low[b]	19.32	10.25
High[c]	26.14	15.62
Schemata congruence		
Congruent[b]	27.35	15.70
Incongruent[c]	17.96	8.86
Schemata evaluation		
Positive[b]	27.49	15.18
Negative[c]	17.82	9.60

[a] no. of memories.
[b] $n = 57$.
[c] $n = 56$.

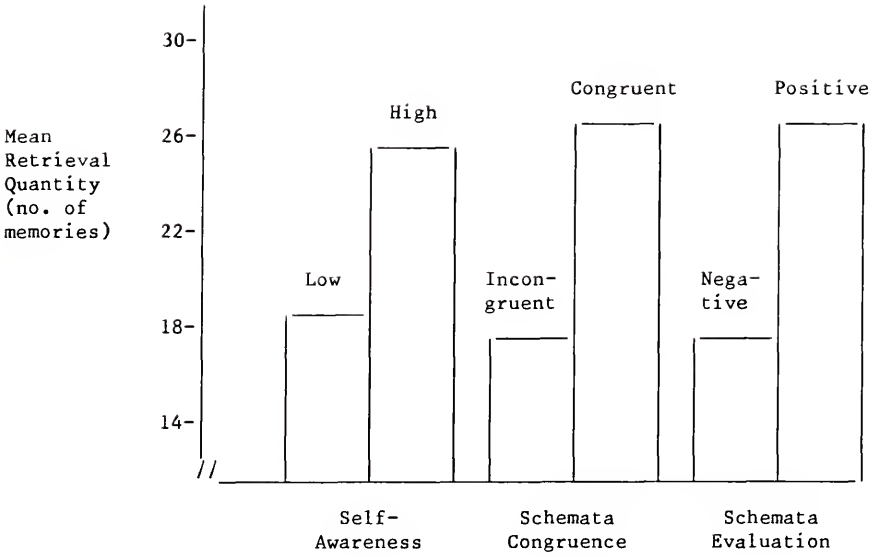

Figure 1

Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Quantity

Two-way Interaction

Self-awareness interacted with schemata congruence to influence retrieval quantity. The interaction indicated a greater retrieval quantity in the congruent compared with the incongruent level of schemata congruence only in the high compared with the low level of

self-awareness. Table 4 presents the mean retrieval quantity values and concomitant standard deviation values for each of the four Self-Awareness X Schemata Congruence experimental cells. Figure 2 depicts the interaction.

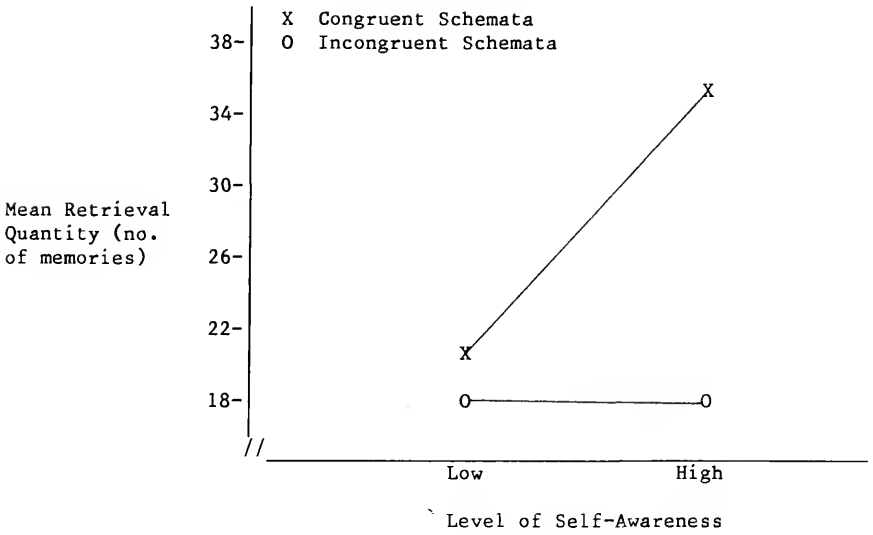

Figure 2

Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Quantity

Table 4

Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Quantity

Experimental condition	Mean retrieval quantity[a]	D[b]	Standard deviation
Low self-awareness			
Congruent schemata[c]	20.41	2.23	10.41
Incongruent schemata[d]	18.18		10.13
High self-awareness			
Congruent schemata[c]	34.54	16.79	17.14
Incongruent schemata[d]	17.75		7.56

[a] no. of memories.
[b] refers to the difference between the congruent and incongruent means in the particular level of self-awareness.
[c] $n = 29$.
[d] $n = 28$.

Three-way Interaction

Self-awareness interacted simultaneously with both schemata congruence and schemata evaluation to influence retrieval quantity. A particularly increased retrieval quantity occurred in the condition that represented both congruent and positive levels (i.e., of the schemata congruence and schemata evaluation factors, respectively) if also the level of self-awareness was high compared with low. A particularly decreased retrieval quantity tended to occur in the condition that represented both incongruent and positive levels if also the level of self-awareness was high compared with low. Additionally, a particularly increased retrieval quantity tended to occur in the condition that

represented either (a) both incongruent and negative levels or (b) both congruent and negative levels if also the level of self-awareness was high compared with low. Table 5 presents the mean retrieval quantity values and concomitant standard deviation values for each of the eight Self-Awareness X Schemata Congruence X Schemata Evaluation experimental cells. Figure 3 depicts the three-way interaction.

Table 5

Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Quantity

Experimental condition	Mean retrieval quantity[a]	D[b]	Standard deviation
Congruent schemata			
Positive schemata			
Low self-awareness[c]	22.53	21.40*	12.23
High self-awareness[d]	43.93		17.50
Negative schemata			
Low self-awareness[d]	18.14	7.00	7.86
High self-awareness[d]	25.14		10.66
Incongruent schemata			
Positive schemata			
Low self-awareness[d]	24.86	5.86	9.40
High self-awareness[d]	19.00		5.72
Negative schemata			
Low self-awareness[d]	11.50	5.00	5.37
High self-awareness[d]	16.50		9.08

[a] no. of memories.
[b] refers to the difference between the means in the low compared with the high level of self-awareness.
[c] $n = 15$.
[d] $n = 14$.
* refers to a significant difference as tested by Newman-Keuls pre-planned comparisons (i.e., alpha = .05; critical value = 7.76; mean square error term used = 108.37).

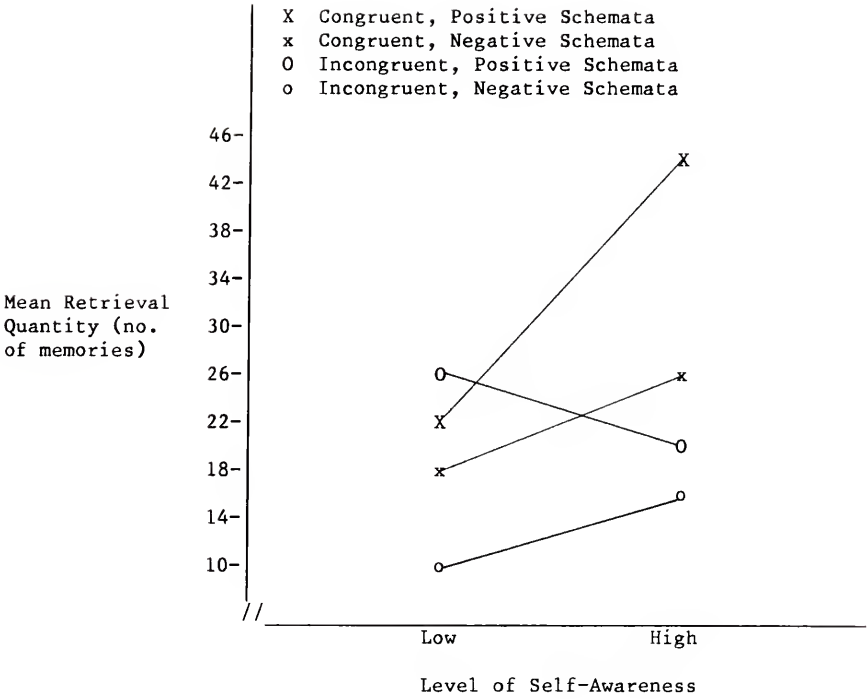

Figure 3

Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Quantity

Effects on Retrieval Latency

Table 6 summarizes the results of the 2 X 2 X 2 between-subjects ANOVA. The first factor reflected the levels of self-awareness, (low, high), the second factor reflected the levels of schemata congruence

(congruent, incongruent), and the third factor reflected the levels of schemata evaluation (positive, negative). Mean retrieval latency was the dependent variable.

Table 6

ANOVA: Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency

Source of variation	Sum of squares	Df	Mean square	F	p
Main effects	13839.13	3	4613.04	20.50	.000
Self-awareness (SA)	868.64	1	868.64	3.86	.052
Schemata congruence (SC)	7588.05	1	7588.05	33.72	.000
Schemata evaluation (SE)	5351.40	1	5351.40	23.78	.000
Two-way interactions	2077.93	3	692.64	3.08	.031
SA X SC	1150.17	1	1150.17	5.11	.026
SA X SE	764.26	1	764.26	3.40	.068
SC X SE	177.80	1	177.80	.79	.376
Three-way interaction	700.14	1	700.14	3.11	.081
SA X SC X SE	700.14	1	700.14	3.11	.081
Explained	16617.20	7	2373.87	10.55	.000
Residual	23630.06	105	225.05		
Total	40247.27	112	359.35		

Main Effects

Main effects on retrieval latency occurred for all three factors. The effects indicated a lesser memory retrieval latency (a) in the high compared with the low level of self-awareness, (b) in the congruent compared with the incongruent level of schemata congruence, and (c) in

the positive compared with the negative level of schemata evaluation. Table 7 presents the mean retrieval latency values and concomitant standard deviation values for each of the two levels of each of the three independent variables. Figure 4 depicts the main effects.

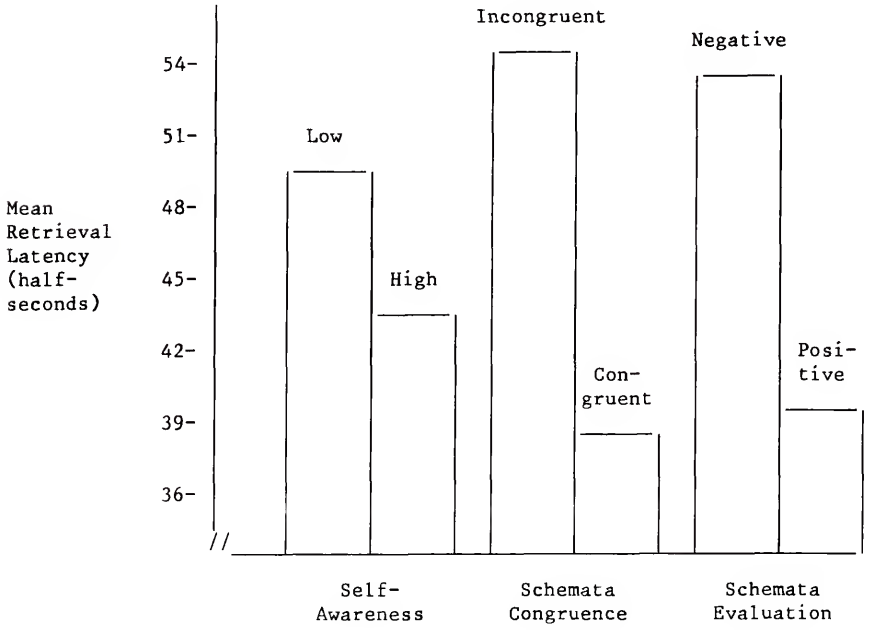

Figure 4

Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency

Table 7

Main Effects of Self-Awareness, Schemata Congruence, and Schemata Evaluation on Mean Retrieval Latency

Experimental condition	Mean retrieval latency[a]	Standard deviation
Self-awareness		
Low	48.62	18.30
High	43.34	19.40
Schemata congruence		
Congruent	37.85	13.99
Incongruent	54.31	19.83
Schemata evaluation		
Positive	39.14	15.76
Negative	53.00	19.50

[a] half-seconds.
[b] $\underline{n} = 57$.
[c] $\underline{n} = 56$.

Two-way Interactions

Self-awareness interacted with schemata congruence to influence retrieval latency. The interaction indicated a lesser memory retrieval latency in the congruent compared with the incongruent level of schemata congruence only in the high compared with the low level of self-awareness. Self-awareness additionally tended to interact with schemata evaluation to influence retrieval latency. The interaction indicated a greater retrieval latency in the negative compared with the positive

level of schemata evaluation only in the low compared with the high level of self-awareness. Table 8 presents the mean retrieval latency values and concomitant standard deviation values for each of the four Self-Awareness X Schemata Congruence experimental cells. Figure 5 depicts the respective interaction. Table 9 presents the mean retrieval latency values and concomitant standard deviation values for each of the four Self-Awareness X Schemata Evaluation experimental cells. Figure 6 depicts the respective interaction.

Table 8

Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Latency

Experimental condition	Mean retrieval latency[a]	D[b]	Standard deviation
Low self-awareness			
Congruent schemata[c]	43.55	10.32	14.10
Incongruent schemata[d]	53.87		20.79
High self-awareness			
Congruent schemata[d]	31.94	22.80	11.34
Incongruent schemata[d]	54.74		19.20

[a] half-seconds.
[b] refers to the difference between the congruent and incongruent schemata means in the particular level of self-awareness.
[c] $n = 29$.
[d] $n = 28$.

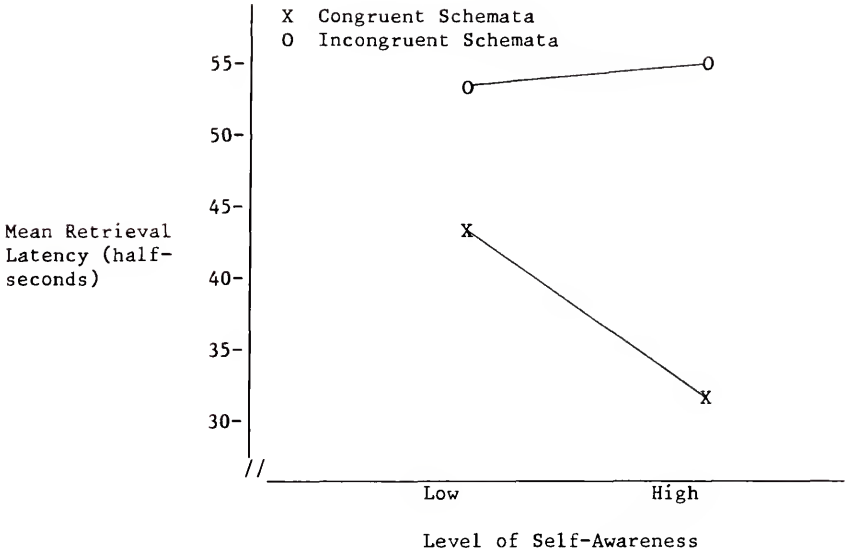

Figure 5

Self-Awareness X Schemata Congruence Interaction on Mean Retrieval Latency

Table 9

Self-Awareness X Schemata Evaluation Interaction on Mean Retrieval Latency

Experimental condition	Mean retrieval latency[a]	$\underline{D}$[b]	Standard deviation
Low self-awareness			
Positive schemata[c]	39.22	19.13	12.58
Negative schemata[d]	58.35		18.37
High self-awareness			
Positive schemata[d]	39.04	8.6	18.74
Negative schemata[d]	47.64		19.43

[a] half-seconds.
[b] refers to the difference between the positive and negative schemata means in the particular level of self-awareness.
[c] $\underline{n}$ = 29.
[d] $\underline{n}$ = 28.

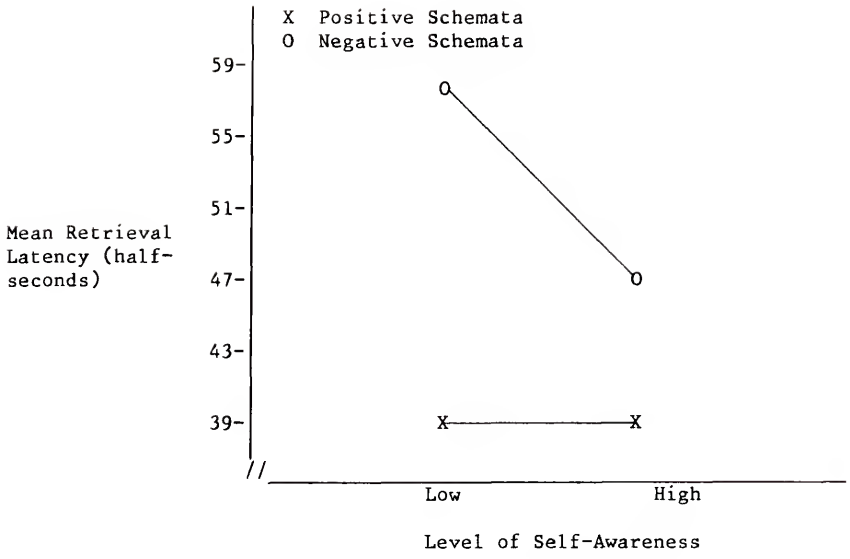

Figure 6

Self Awareness X Schemata Evaluation Interaction on Mean Retrieval Latency

Three-way Interaction

Self-awareness tended to interact simultaneously with both schemata congruence and schemata evaluation to influence retrieval latency. A particularly decreased retrieval latency occurred in the condition that represented both congruent and positive levels (i.e., of the schemata congruence and schemata evaluation factors, respectively) if also the level of self-awareness was high compared with low. A particularly increased retrieval latency occurred in the condition that represented both incongruent and positive levels if also the level of self-awareness was high compared with low. Additionally, a particularly decreased

retrieval latency (a) occurred in the condition that represented both congruent and negative levels and (b) tended to occur in the condition that represented both incongruent and negative levels if also the level of self-awareness was high compared with low. Table 10 presents the mean retrieval latency values and concomitant standard deviation values for each of the eight Self-Awareness X Schemata Congruence X Schemata Evaluation experimental cells. Figure 7 depicts the interaction.

Table 10

Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Latency

Experimental condition	Mean retrieval latency[a]	$\underline{D}$[b]	Standard deviation
Congruent schemata			
Positive schemata			
Low self-awareness[c]	37.93	11.55*	12.25
High self-awareness[d]	26.38		8.23
Negative schemata			
Low self-awareness[d]	49.57	12.08*	13.82
High self-awareness[d]	37.49		11.53
Incongruent schemata			
Positive schemata			
Low self-awareness[d]	40.61	11.09*	13.24
High self-awareness[d]	51.70		17.79
Negative schemata			
Low self-awareness[d]	67.14	9.36	18.53
High self-awareness[d]	57.78		20.72

[a] no. of memories.
[b] refers to the difference between the means in the low compared with the high level of self-awareness.
[c] $\underline{n}$ = 15.
[d] $\underline{n}$ = 14.
* refers to a significant difference as tested by Newman-Keuls pre-planned comparisons (i.e., alpha = .05; critical value = 11.17; mean square error term used = 225.05).

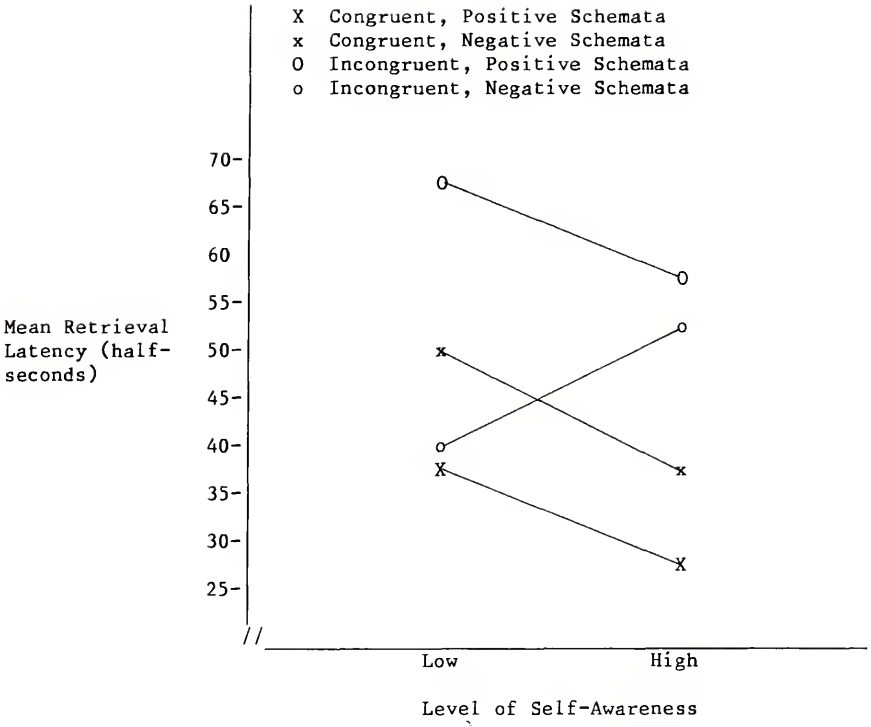

Figure 7

Self-Awareness X Schemata Congruence X Schemata Evaluation Interaction on Mean Retrieval Latency

Summary of Main Results

Predictions (i.e., hypotheses 1, 2, 3, 4, 5, and 6) concerning the presence of main effects of each of the three independent variables on both retrieval quantity and retrieval latency were confirmed. As

predicted, subjects in a high self-awareness condition demonstrated an increased retrieval quantity and a decreased retrieval latency compared with subjects in a low self-awareness condition. As predicted, subjects in a congruent schemata condition demonstrated an increased retrieval quantity and a decreased retrieval latency compared with subjects in an incongruent schemata condition. As predicted, subjects in a positive schemata condition demonstrated an increased retrieval quantity and a decreased retrieval latency compared with subjects in a negative schemata condition.

Predictions (i.e., hypotheses 7 and 8) concerning the presence of an interaction between self-awareness and schemata congruence on both retrieval quantity and retrieval latency were generally supported. As predicted, subjects in a congruent schemata condition demonstrated an increased retrieval quantity and a decreased retrieval latency if they also were in a high self-awareness condition compared with a low self-awareness condition. Subjects in an incongruent schemata condition did not, however, demonstrate a decreased retrieval quantity or an increased retrieval latency if they also were in a high self-awareness compared with a low self-awareness condition. Within the incongruent schemata condition, differences were not demonstrated solely as a function of level of self-awareness.

Predictions (i.e., hypotheses 9 and 10) concerning the presence of a three-way interaction between self-awareness, schemata congruence, and schemata evaluation on both retrieval quantity and retrieval latency were generally supported. As predicted, subjects in an schemata

condition that was both congruent and positive demonstrated a particularly increased retrieval quantity and a particularly decreased retrieval latency if they also were in a high self-awareness condition compared with a low self-awareness condition. Subjects in a schemata condition that was both incongruent and negative did not, however, demonstrate a particularly decreased retrieval quantity or a particularly increased retrieval latency if they also were in a high self-awarenenss condition compared with a low self-awareness condition. In fact, subjects in a schemata condition that was both incongruent and negative tended to demonstrate an increased retrieval quantity and a decreased retrieval latency if they also were in a high self-awareness condition compared with a low self-awareness condition.

Two additional results are noteworthy concerning the three-way interactions: (a) Subjects in a schemata condition that was both congruent and negative demonstrated a decreased retrieval latency and tended to demonstrate an increased retrieval quantity if they also were in a high self-awareness condition compared with a low self-awareness condition, and (b) subjects in a schemata condition that was both incongruent and positive demonstrated an increased retrieval latency and tended to demonstrate a decreased retrieval quantity if they also were in a high self-awareness condition compared with a low self-awareness condition.

CHAPTER V
DISCUSSION AND CONCLUSIONS

Memory Retrieval: The Role of Self-Schemata

It has been established in research concerning memories of laboratory stimuli that (a) the retrieval of a memory is always triggered by a retrieval cue even if the cue (referred to as a schema because of its categorical function) cannot be identified (Tulving & Thomson, 1973); (b) the schemata used at the retrieval stage are effective in triggering recall only if they were used at the encoding stage (this principle is referred to as the "encoding specificity" principle, Tulving and Thomson, 1973, p.359); and (c) the detecting of recurrences of events according to schemata is a fundamental cognitive process developed early in life (c.f., Hasher & Zacks, 1984). The results of the present investigation support the generalization of these contextual principles to the realm of memories of life experiences. The feasibility and effectiveness of using self-schemata as retrieval cues in a category generation task that involved the retrieval of a stream of recurrences of life events was demonstrated. Consequently, the role of self-schemata as a organized system of internal cues that is used in the encoding of memories can reasonably be inferred. These general principles have been supported in only scant, quite preliminary research to date (Bellezza, 1984; Markus, 1977; Warren, Hughes, & Tobias, 1985).

The present results extend beyond the validation of general principles concerning self-schemata; factors that interact to influence the specific elaboration of self-schemata in the memory retrieval process are identified. One factor is the congruence or incongruence of

the memory to the self-theory. The global, superordinate congruent-incongruent standard of categorization has been found to be an important variable in laboratory memory research (Underwood, 1979), in self-schemata research (Markus, 1977; Mills, 1983), and in research concerning the relationship between implicit personality theory and memory for information about persons (i.e., hypothetical persons defined by the experimenter) (c.f., Srull, Lichtenstein, & Rothbart, 1985; Wyer, Bodenhausen, & Srull, 1984). The present results support its contribution additionally to an understanding of the process of recollecting life experiences that represent aspects of self.

The finding that persons overall access self-congruent experiences more quickly and in greater quantity than they access self-incongruent experiences is consistent with some findings in related realms. Numerous researchers have found that persons are more likely to notice and to recall confirming, as opposed to disconfirming, instances (Einhorn & Hogarth, 1978; Snyder & Cantor, 1979; Snyder & Swann, 1978; Taylor, Crocker, & D'Agostino, 1978; Tversky, 1977). Other researchers have found, however, that incongruent or disconfirming instances are more likely to be recalled (Hastie, 1980; Wyer & Gordon, 1982; Wyer, Bodenhausen, & Srull, 1984). Existing research is, thus, conflictual and indicates that the type of preferential access that occurs depends on numerous variables. The present investigation introduces one intra-individual variable, that of the individual's state of consciousness at the time of retrieval, that appears to influence pronouncedly the preferential access process. In the state of consciousness in which persons are not acutely aware of being both the subject and the object of the

retrieval search (i.e., the low self-aware state), no preferential access of self-congruent experiences occurs. In the highly self-aware state of consciousness, however, considerably more self-congruent access is facilitated. The present results indicate that the discrepancy between the self-congruent and self-incongruent retrieval quantities in the low self-aware state was approximately 2 memories, while the respective discrepancy in the high self-aware state was approximately 17 memories. An analogous process occurs concerning the time taken to recall a self-congruent as opposed to a self-incongruent memory. The discrepancy between the self-congruent and self-incongruent retrieval latencies in the low self-aware state was approximately 10 half-seconds while the respective discrepancy in the high self-aware state was approximately 23 half-seconds.

These results indicate that a superordinate categorizing dimension such as "like self-unlike self" that might appear to be elaborated on in a rather constant manner, rather seems to be elaborated on in a fluctuating manner depending on the background context. In this instance the background context is that of self-awareness. The perceived relationship between what is similar to self and what is dissimilar to self appears to become more salient in the high self-aware state. The identification of process variables, such as level of objective self-awareness, that influence the manner of elaboration of self-schemata is a research priority, according to Schmittdiel (1983). Schmittdiel observed that process variables have been conspiciously neglected in the interest of structural dimensions.

Another, perhaps structural, dimension whose selective elaboration depends on the process variable self-awareness is the evaluative (positive-negative) dimension. It is centrally used by persons in information processing generally (Osgood, Suci, & Tannenbaum, 1957) and in the processing of information pertaining to the self more specifically (Mischel, Ebbesen, & Zeiss, 1973). Kim and Rosenberg (1980) found in their analysis of personal construct systems, that the good-bad evaluative dimension was the sole dimension that emerged as a superordinate standard of categorization in all persons' systems. The present results support its importance in accounting for variability in the retrieval of personally relevant information. The specific result that persons overall access experiences that reflect unfavorably on the self in smaller quantity and more slowly than they access experiences that reflect favorably on the self is generally consistent with related research. Matlin and Stang (1978) concluded on the basis of summarizing research on selectivity in recall that persons tend to both rehearse and recall the pleasant more than the unpleasant or neutral. Markus and Smith (1981) concluded that research indicates that the self works to maintain high self-esteem and attends selectively to the good aspects of behaviors. They stated that self-structures influence memory of events about the self so that good, correct, responsible, consistent, and successful activities are much more likely to be recalled than the bad, incorrect, irresponsible, or unsuccessful ones.

A generalization concerning the preferential retrieval of good-self experiences is a misleading simplification, however, according to interaction effects of the present investigation. As discussed in the next

section, the three-way interaction indicates that when both the individual's state of consciousness and the self-congruence or self-incongruence of the memory are also considered, certain bad-self experiences are actually accessed faster than are certain good-self experiences. Additionally, a two-way interaction indicated that an individual's state of consciousness at the time of retrieval tended to influence his or her ease of accessing bad-self experiences. Experiences that reflect the bad-self tend to surface to a conscious level of awareness more quickly in the high self-aware state than they do in the low self-aware state. Persons took approximately 19 half-seconds longer to recall a bad-self versus a good-self experience when not highly self-aware though they took only approximately 9 half-seconds longer to recall the respective bad-self experience when highly self-aware at the time of memory retrieval. This marginally significant ($p<.068$) effect is discussed because it is, in fact, consistent with preliminary findings in the self-awareness literature concerning information processing (i.e., concerning the processing of other than memories of life experiences). The result substantiates the research conclusion that the high self-aware state of consciousness facilitates the more efficient processing of information that reflects unfavorably on the self. For instance, Turner (1978b) found that high scores on the Private Self-Consciousness subscale of the Self-Consciousness Scale (Fenigstein et al., 1975) were correlated with quick judgements (i.e., on a 2-point "me-not me" rating scale) concerning the self-descriptiveness of socially undesirable trait terms.

One additional finding concerning an interaction effect that involves the evaluative dimension may be noteworthy. There is a tendency ($p<.062$) for females to access experiences according to a good-self/bad-self ratio of 1.76/1 (i.e., specifically, 30 memories/17 memories) while males access according to a respective ratio of 1.32/1 (i.e., specifically, 25 memories/19 memories). Females, thus, may access information reflecting on the self in a less balanced manner than do males. This tendency of females may have its adaptive aspects in maintaining high esteem though it may also have its maladaptive aspects in shielding self from reality-based information pertaining to the self. Existing research does not specifically clarify the present gender finding. Some researchers that have investigated autobiographical retrieval have found gender differences (Meltzer, 1931; Robinson, 1976). Other researchers conclude that there are no substantial gender differences in memory retrieval (Maccoby & Jacklin, 1974; Matlin & Stang, 1978). Note that gender was not significantly involved in any other interaction (i.e., two-way, three-way, or four-way); nor was there a main effect of gender. The result that the impact of self-awareness does not depend on gender is consistent with the self-awareness literature (Carver & Scheier, 1981).

Memory Retrieval: The Role of Self-Awareness

It has been established in research concerning memories of laboratory stimuli that the retrieval context, referring to all aspects from

both within and without the individual present at the time of retrieval, significantly affects the nature of the retrieval process (Tulving, 1983). The present results indicate that objective self-awareness functions as a retrieval context that significantly affects persons' process of retrieving life experiences. Objective self-awareness, referring to that state of consciousness in which persons are acutely aware of being an object in the world and the object of their own consciousness, influences both the amount of memories retrieved and the amount of time taken to retrieve any particular memory.

According to the present results, persons process of accessing various types of information reflecting the self becomes more variable when persons are made to become self-aware; intraindividual modes of responding become more pronounced. The results, therefore, indicate that a consideration of self-awareness as a control process may be useful. Control processes refer to processes that account for persons' invariably selective, biased information processing (Underwood, 1979). Control processes govern the elevating and lowering of thresholds of cognition, resulting in inhibition and facilitation effects, respectively (Erdelyi & Goldberg, 1979). The present results indicate that self-awareness has both inhibition and facilitation effects. Specifically, inhibition occurs in the high self-aware state when persons recall experiences that relate to a centrally important positive though incongruent self-schemata. Persons take longer to recall, and tend to recall fewer, of these memories if they are highly self-aware. For example, consider a prototypical person who privately believes she is not a generous person though believes that the generous-selfish self-schema is

an important, central dimension in judging persons. According to the present results, she should not exhibit difficulty in recalling incidents that reflect her generosity if she is not highly self-aware, but would be relatively inhibited if made to be highly self-aware at the time of retrieval. Thus, persons may be relatively inhibited in invalidating their perceived liabilities when highly self-aware. One explanation for this effect is that persons more acutely experience the invalidation as self-deception while in that state due to their increased and simultaneous awareness of their opposing bad-self (e.g., selfish) tendencies.

One assumption on which the forementioned explanation is predicated is that self-schemata have an inherently bipolar nature. Persons are assumed to elaborate on one pole of a bipolar self-schema with an awareness of the opposing pole. The simultaneous awareness is considered to be inevitable though it may be present on various levels of awareness. The present results appear to necessitate a consideration of the assumption of bipolarity, an assumption that is solidly grounded in self-concept, personal construct, and some of the self-schemata theory.

Self-awareness additionally has, in contrast to its inhibition effects, facilitation effects. One particularly significant and pronounced facilitation effect concerns the recollection of experiences that are congruent with persons' central and positive self-schemata. Persons are apparently able to be considerably more self-enhancing when highly self-aware if the enhancement is of a self-perception that is congruent with their self-theory. Persons are more able to seek out

information that validates their most valued attributes if they are highly self-aware. For example, consider a prototypical person who believes, for instance, that he is trustworthy and that trustworthy-untrustworthy is an important dimension in judging people. The present results suggest that he would take considerably less time to recall, and recall many more, experiences that validate his perceived trustworthiness if he is made to be highly self-aware. The increased awareness of the bad-self (i.e., untrustworthy) tendencies is presumed to facilitate the desire and tendency to validate good-self (i.e., trustworthy) tendencies, noting that because the latter is a strong, integrated personal asset self-deception is not involved.

A simultaneous consideration of the inhibition effect and the facilitation effect (and given consideration to all other effects) clarifies that (a) self-awareness does not globally facilitate the retrieval of any and all information solely because the information pertains to the self, (b) self-awareness does not globally facilitate the retrieval of any and all kinds of information solely because the information is self-enhancing, and (c) self-awareness does not solely result in an increased manifestation of persons' self-diminishing or self-critical tendencies. Duval and Wicklund's (1972) theory relates to the latter aspect. They theorized that self-awareness results in self-critical tendencies and in lowered self-esteem attributable to the increased perception of discrepancies between the present state and standards of correctness.

A second condition in which facilitation occurs in high self-awareness is when persons recall experiences that relate to a centrally

important congruent through negative self-schema. For example, consider a prototypical person who privately believes that she is selfish and is requested to recall experiences in which she reflected that trait. The present results suggest that she would recall more of these self-congruent experiences that reflect unfavorably on herself significantly faster, and tend to recall more of those experiences, if she is made to be highly self-aware. It can be presumed (i.e., due to experimental assessment procedures) that the person has a strong, integrated sense of self as selfish since it is more difficult due to social desirability and centrality-positivity biases (Lewicki, 1983) to rate self unfavorably on a superordinate self-schema (c.f., Adams-Webber, 1982). The simultaneous awareness of the good-self tendencies of the person would not be sufficient in this case to inhibit the awareness and retrieval of experiences relating to the bad-self. This result is consistent with the explanation that self-awareness inhibits self-deceptive tendencies and facilitates veridical (i.e., honest and truthful) tendencies; given the apparent strength of the bad-self tendencies, self-deception would be involved should a facilitation effect not occur. It may be noted that this explanation is consistent with preliminary evidence in the self-awareness literature indicating that self-awareness increases the veridicality of self-report (Scheier, Buss, & Buss, 1978; Turner, 1978a).

The notion of increased veridical access during high self awareness warrants a consideration of one additional facilitation tendency, noting that the tendency did not meet a .05 level of statistical significance. Specifically, there was a facilitation tendency in the high self-aware

state for the retrieval of experiences that reflect unfavorably on the self even if the experiences relate to a disavowed self-perception. For example, consider a prototypical person who believes that the trustworthy-untrustworthy dimension is central to his self-theory but who does not consider himself to be untrustworthy. When he attempts to retrieve bad-self (i.e., untrustworthy) experiences, he tends to retrieve the experiences more quickly and in greater quantity if he is made to be highly self-aware at the time of retrieval. Presumably, persons have the bad-self memories available on some level and self-awareness tends to facilitate their accessibility. Persons are less able to disavow the negative-self while highly self-aware or, conversely, are more able to disavow the latter while not highly self-aware. This facilitation tendency is consistent with the explanation that self-awareness inhibits self-deceptive biases and facilitates veridical and extensive retrieval.

The present results question theory concerning a dichotomous state of consciousness; theory that is supported by Duval and Wicklund (1972). Duval and Wicklund assert that persons' consciousness is directed either toward external objects in the subjectively self-aware state or toward one's conscious state, personal history, physical being or other personal aspects of self in the objectively self-aware state. They state that "increased objective self-awareness" simply denotes a greater proportion of time spent in the objective state and "should not be taken to mean that the objective-subjective self-awareness dimension is continuous" (p.3). This theory poses important theoretical problems because it does not allow for the greater or lesser functioning of the

self as a control process that regulates the accessing of information, even that pertaining to the self. The present results support the notion that there is a continuum of involvement of the self even on an inherently self-involving and self-objectifying information search. The retrieval task used in the present investigation necessarily required the subject to access information about self as an object in the world and was, to this extent, self-objectifying. A ceiling effect did not occur in the low self-aware condition, however, as may have occurred if the notion of "increased" self-awareness was not viable.

The present results buttress the notion of the self as a fluctuating control process regulating the accessibility of information. This view of the self has been relatively neglected in experimental literature, which has tended to study the self as solely a concept or a schemata rather than also as a level of control. At any given moment numerous control processes interact to regulate persons' cognitions and behaviors; self-awareness as one salient control process is of ecological importance since fluctuations in self-awareness recurrently occur both spontaneously and volitionally during the ongoing flow of consciousness. The present results indicate that fluctuations in self-awareness influence the ease of accessibility to memories of life experiences. The specific nature of the impact of the fluctuations in self-awareness depend on both the self-evaluative and self-validating or self-invalidating implications of the recollected experience. Overall, the high self-aware state can be concluded to facilitate veridical retrieval efforts and inhibit self-deceptive retrieval efforts.

Implications of the Results

One practical implication of the present results may be in the realm of personality assessment. During the completion of personality assessment instruments and interviews, persons invariably review past tendencies and aspects of self. The amount and type of information recalled and the ease with which it is recalled has implications for the validity of the assessment procedure, noting that the predictive validity is of central concern. If persons are more likely to engage in a veridical, extensive review of past behaviors and tendencies and are less likely to engage in self-deceptive portrayals of themselves while highly self-aware then the induction of that state during personality assessment may result in an increase in the predictive validity of the particular procedure. Preliminary research supports the conceptual relationship between the review of past behaviors, the expressing of attitudes, the stating of future intentions, and behavioral actions (Fazio & Zanna, 1976; Olson & Zanna, 1978), as well as the conceptual relationship between self-awareness, self-reports, and behavioral tendencies (Scheier et al., 1978; Turner, 1978a). Scheier et al. (1978) and Turner (1978a) found that self-reports of dispositional tendencies (toward hostility and dominance, respectively) were better predictors of actual behavior among subjects high in the disposition toward private self-consciousness than among subjects lower in the disposition toward private self-consciousness. The present results considered in conjunction with preliminary related research, thus, support future research investigation into the role of self-awareness in increasing the predictive validity of personality assessment procedures, perhaps including interview procedures.

The role of self-awareness in influencing persons' accessibility to memories reflecting the self additionally may have implications in the realm of psychotherapy. The present results suggest that psychotherapy patients who are made to be highly self-aware will access certain memories with greater ease and other memories with greater difficulty than those patients who are not made to be highly self-aware. No primary focus on remote or childhood memories is implied because it is intuitively clear that much of a patient's stream of thought during a psychotherapy session invariably relates to memories of quite recent, daily life experiences. The present results suggest that the aspects of life experiences that the patient will allow himself or herself to recall depends at least partially on his or her immediate level of self-awareness (i.e., the patient's self may be more or less an object of the patient's own disclosure). The present results, thus, highlight the importance of the intraindividual context of accessibility to cognition, a context that has been neglected in psychotherapy research relative to the interpersonal context of disclosing cognition to the psychotherapist (c.f., Luborsky et al., 1979). Self-awareness is undoubtedly one of many complex, interacting control processes regulating thresholds of cognition within the psychotherapy session, though the present results suggest that it is one control process worthy of future investigation.

Limitations of the Investigation

One limitation of the present investigation concerns the lack of a more extensive investigation of cognitive processes that occurred during the retrieval period. Targeted processes may have included (a) the setting of response criteria, which is related to the category bandwidth and the defining features of the prototypical instance (c.f., Barsalou, 1985), (b) categorical search processes that occur subordinate to the self-schemata categorical search process (c.f., Whitten, W.B., II, & Leonard, 1981), (c) conscious and unconscious decision processes whether to initiate or continue the search process, and (d) interfering processes including distractibility and task-irrelevant cognitions. Many of these processes are intrinsic to the multidimensional phenomenon termed "memory" and, thus, are part of what was examined. A more extensive investigation, however, would clarify the nature of the impact of the experimentally manipulated control processes.

The limitation relates to another limitation of the present investigation: The experiment used a research paradigm that is not yet well-established in memory research concerning the retrieval of life experiences. This was unavoidable because of the preliminary state of that research. Fortunately, and to the benefit of future researchers in the area, the numerous exploratory aspects of the paradigm did prove to be workable. The degree of generalization from memory research involving contrived laboratory stimuli, therefore, appears promising.

An additional limitation of the present investigation concerns the lack of a more extensive investigation of characteristics of the recalled experiences that are of interest to the study of personality

and undoubtedly inextricably interrelate to the above mentioned processes, including (a) attributional processes, (b) other persons involved, (c) specific content and themes, and (d) emotional valence. This was avoided to both protect subjects' privacy and to limit the scope of the investigation.

Finally, a quite specific limitation of the investigation concerns the assessment of subjects' self-theories. The present investigation clearly extended the level of the assessment of persons' self-theories compared to that level used in existing experimental memory research. The process of eliminating plausible rival theoretical explanations, however, would have been aided by an even more thorough and specific assessment. Characteristics that may have been examined include (a) the overall positive or negative evaluative nature of the self-system (i.e., high or low self-esteem), (b) the overall like self-unlike self nature of perceptions, referred to as the complexity of the self-concept (c.f., Ziller, 1973), (c) interrelationships among the self-schemata and the overall tightness or looseness of the self-theory (c.f., Mancuso & Adams-Webber, 1982), and (d) interrelationships among perceptions of self and perceptions of others concerning the descriptiveness of a particular attribute.

Recommendations for Future Research

Researchers may continue to contribute to the building of a multiprocess, multilevel model of memory functioning that encompasses memories of life experiences by conducting experimental research where control is exerted over the retrieval context. Retrieval contexts of

high ecological relevance may include those impacted by the following interrelated overlapping factors: (a) physiopharmacological states (c.f., Nelson, McSpadden, Fromme, & Marlatt, 1986), (b) affective states, (c) interpersonal states (c.f., MacWhinney, Keenan, & Reinke, 1982) including the immediate therapist-patient interaction (c.f., Luborsky et al., 1979), (d) antecedent activation of memories, (e) antecedent activation of cognition at varying levels of conscious awareness (i.e., using priming manipulations; c.f., Seifert, Abelson, McKoon, & Ratcliff, 1986); and (f) states of consciousness (including hypnotic states; c.f., Kihlstrom & Evans, 1979; Kihlstrom, Brenneman, Pistole, & Shor, 1985; Stager & Lundy, 1985), deindividuation or lowered self-awareness states, and public self-consciousness states. Regarding the latter, the present results justify the continued exploration of the impact of the objective high self-aware state of consciousness specifically as induced by the mirror manipulation. The manipulation was found to be sufficiently powerful to influence the memory retrieval process. It is important that researchers avoid attempting to identify the most important retrieval context and instead attempt to specify the impact (and the interactive impact) of particular contexts on particular types of cognitive processes and on particular types of information searches. Although the resultant theory is extremely complex, existing research (particularly that concerning the physiology of memory; c.f., Mayes, 1981) indicates that parsimonious theory may be misleading.

The specific results of the present investigation additionally justify the continued exploration of the role of self-schemata in the

organization and retrieval of life experiences. Computerized assessment can be used to a much greater advantage by conducting even more differentiated assessments of persons' self-theories, thereby enabling more comprehensive theoretical formulations to be developed. Theory and research in personal construct theory appears to offer a most sophisticated contribution to an assessment of persons' construal of themselves and others (c.f., Neimeyer & Neimeyer, 1981). Dimensions in addition to schemata congruence and evaluation that interrelate to the elaboration of self-schemata may be identified. Researchers may seek to identify effective retrieval cues in addition to self-schemata, including visual representations (c.f., Tversky & Baratz, 1985) and conceptual categories that represent interpersonal experiences.

Finally, researchers additionally may explore the current unexplored but fertile domain of how persons use their memories (at varying levels of conscious awareness) to modify self-perceptions, perceptions of others, and courses of action. Memories of life experiences constitute a vast internal source of self-information that significantly functions in the stream of consciousness but until recently largely has been ignored in research as such. Overall, researchers are encouraged to take a comprehensive view of the retrieval process because the concomitant research is at such an exploratory stage.

APPENDIX A
EXPERIMENTAL STIMULI

Fifty trait adjectives, which are organized and conceptualized as 25 bipolar trait adjectives, comprised the pool of trait adjectives from which schemata were derived. The adjectives were selected from Anderson's (1968) list of 555 personality trait words. Each was rated according to its likeability and meaningfulness as a personality characteristic. Anderson carefully constructed this list through extensive screening and normative work. An initial pool of 18,000 traits complied by Allport and Odbert (1936) was eventually narrowed to 555 trait adjectives. Anderson (1968) specifically constructed the list for use in research related to information integration in personality impression tasks. Anderson (1968) provided normative data on the likeableness and meaningfulness of the words on the basis of ratings by 100 male and female college students. Anderson's (1968) analyses indicated that the main effect of gender and the Gender by Word interaction were nonsignificant. Subsequent researchers have extended Anderson's (1968) normative data. The use of the list is widespread, particularly in social and personality psychology.

For the purposes of the present investigation, the meaningfulness normative ratings were particularly useful. Bipolar trait adjectives provided the basis for the experimental paradigm and it was important that both poles were high in meaningfulness. Anderson's (1968) meaningfulness ratings were based on 100 subjects ratings of 555 words on a five point scale, which varied from (0) "I have almost no idea of the

meaning of this word" to (4) "I have a very clear and definite understanding of the meaning of this word" (p. 277). The intermediate steps also were verbally categorized. The subjects were instructed to rate each of the words according to how well they knew its meaning as a description of persons. The subjects were encouraged to spread their ratings over the entire 0-4 range as much as possible. Various cutoff points for high meaningfulness have been recommended for research purposes (e.g., Anderson, 1968, proposed a 3.45 cutoff point). A perusal of the relevant research indicated, however, that no precise point has widely agreed upon significance. Rather, the research utility of the meaningfulness ratings lies in the ability to exclude low meaningful traits.

Only high meaningful traits (i.e., meaningfulness ratings within a range from 3.58 to 3.86), which were paired into bipolar dimensions, were used in the present investigation. Those traits whose bipolar opposite was low in meaningfulness, indistinct, or difficult to define in a word were excluded as candidates for the experimental stimuli list. The 48 traits that were selected are presented in Table 11. Note that the traits "attractive" and "unattractive" were not on Anderson's (1968) list; Anderson screened all traits pertaining to physical characteristics. The forementioned traits were included in the present investigation because it is now recognized that physical characteristics are important aspects of the development of the self-concept.

Table 11
Experimental Stimuli

Trait	L[a]	M[b]	Trait	L	M
truthful	545	384	untruthful	43	380
intelligent	537	368	unintelligent	168	364
generous	459	370	stingy	143	368
courageous	471	366	cowardly	110	374
independent	455	374	dependent	254	360
thoughtful	529	376	thoughtless	77	366
unselfish	510	370	selfish	82	384
outgoing	412	364	shy	291	376
punctual	466	382	unpunctual	192	366
modest	428	374	boastful	122	380
tolerant	461	372	intolerant	98	362
obedient	373	380	disobedient	128	378
competent	447	374	incompetent	110	364
broad-minded	503	364	narrow-minded	80	374
decisive	427	360	indecisive	219	376
gentle	503	368	forceful	263	358
tidy	427	382	untidy	175	386
cooperative	476	380	stubborn	196	380
friendly	519	380	unfriendly	92	386
skilled	433	362	unskilled	224	360
trustworthy	539	370	untrustworthy	65	376

TABLE 11 - continued

Trait	L	M	Trait	L	M
reliable	527	374	unreliable	104	386
popular	497	368	unpopular	222	362
kind	520	368	hostile	91	372

Source: Selected from Anderson's (1968) list of 555 trait adjectives.

Note: The traits "attractive" and "unattractive," which were not on Anderson's (1968) list, were two additional traits in the pool of experimental stimuli.

[a] refers to the likeability ratings of the trait adjectives. The higher the rating, the more favorable or desirable the trait as a description of a person (Anderson, 1968).

[b] refers to the meaningfulness rating of the trait adjective. The higher the rating, the more meaningful the trait in the description of a person (Anderson, 1968).

APPENDIX B
INFORMED CONSENT

The experimental research project concerns the identification of factors which affect and regulate the process of recollecting life experiences. The organization of memories, the cues which trigger the recollection, and the relationship of memories to self-perceptions are the central research concerns. You will be requested to rate various personality traits according to designated criteria. You will also be requested to recall memories of experiences that you have had during your life in response to a series of words. You will be requested to press a designated key on the computer each time a memory is recalled. You will not, at any time, be requested to disclose the content of your memories. Your privacy will, thus, be maintained.

Benefits expected from participation in the experiment may include an increased sense of self-exploration and self-knowledge. Sometimes, however, persons prefer to avoid self-exploration since they find it to be uncomfortable. Should you find the experimental procedures to be uncomfortable, you are free to withdraw your consent and to discontinue participation in the research project at any time without prejudice. If necessary, follow-up counseling can be made available.

Monetary compensation will not be awarded for participation in the experiment.

I am willing to answer any inquiries you may have concerning the experimental procedures. You may contact me at my home residence: 11393 S.W. 112th Street, Miami, Florida 33176, (305) 595-7874. You may alternatively arrange to meet with me while I am in Gainesville for the running of the experiment. You may leave a message with Dr. Greg Neimeyer at 392-6768 for me to contact you to arrange an appointment.

I have read and I understand the procedure described above. I agree to participate in the procedure and I have received a copy of this description.

Subject	Date	Witness	Date
Relationship if other than subject	Date	Principal Investigator's name	Date

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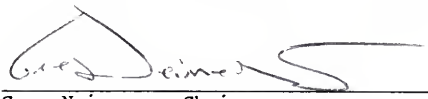

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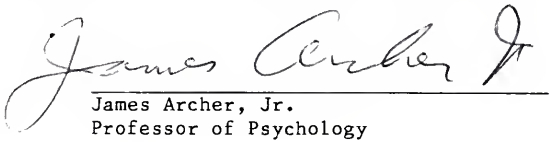

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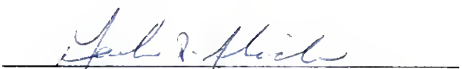

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